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PLANT VARIETY PROTECTION ACT AMENDMENTS

96-1-2

HEARINGS

BEFORE THE

SUBCOMMITTEE ON DEPARTMENT INVESTIGATIONS, OVERSIGHT, AND RESEARCH

OF THE

COMMITTEE ON AGRICULTURE

HOUSE OF REPRESENTATIVES

NINETY-SIXTH CONGRESS

FIRST AND SECOND SESSIONS

ON

H.R. 999

JULY 19, 1979, AND APRIL 22, 1980

Serial No. 96-CCC

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PLANT VARIETY PROTECTION ACT AMENDMENTS

THURSDAY, JULY 19, 1979

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON DEPARTMENT INVESTIGATIONS,
OVERSIGHT, AND RESEARCH OF THE
COMMITTEE ON AGRICULTURE,
Washington, D.C.

The subcommittee met, pursuant to notice, at 2:30 p.m., in room 1301, Longworth House Office Building, Hon. E de la Garza (chairman of the subcommittee) presiding.

Present: Representatives Fithian, Skelton, Wampler, Heckler, and Grassley.

Staff present: William A. Imhof and J. Rebert Franks, associate counsels; Glenda L. Temple, clerk; Humberto Ruben Pena and Gerald R. Jorgensen.

OPENING REMARKS OF HON. E DE LA GARZA, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. DE LA GARZA. The subcommittee will be in order.

The subcommittee is holding hearings today on H.R. 999, which amends the Plant Variety Protection Act, Public Law 91-577. The bill contains 21 amendments. The USDA, in recommending this legislation, states that 12 of the amendments are proposed to clarify wording and make no substantive changes in the requirements, 4 proposals would provide changes in present requirements but would have no significant regulatory or economic impact, and 5 of the proposals would delete or alter obsolete requirements.

The stated purpose of the Plant Variety Protection Act, enacted in 1970, is to encourage the development of new varieties, to make them available to the public to provide protection on a voluntary basis to the developers and thereby to promote progress in agriculture in the public interest.

Two sections of the bill appear to be of primary importance and concern in these hearings—section 14, which extends the period of protection from 17 years to 18 years, and section 21, which deletes current exemptions for six vegetables in the act.

We understand that an additional proposal not in H.R. 999, as well as a closely related amendment to the Federal Seed Act, will be offered during these hearings. We welcome such proposals and assure that those, as well as any other proposals, will be given full consideration.

It is the intent of this hearing to provide ample opportunity for all interested parties to present their views.

[H.R. 999 and the report from U.S. Department of Agriculture follows:]

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96TH CONGRESS
1ST SESSION

H. R. 999

To amend the Plant Variety Protection Act (7 U.S.C. 2321 et seq.) to clarify its provisions, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JANUARY 18, 1979

Mr. DE LA GARZA (for himself, Mr. BURGENER, Mr. COELHO, Mr. CORRADA, Mr. FASCELL, Mr. GRASSLEY, Mr. GUDGER, Mr. HANSEN, Mr. HIGHTOWER, Mr. KOSTMAYER, Mr. LEE, Mr. MADIGAN, Mr. MATHIS, Mr. MINETA, Mr. NICHOLS, Mr. PANETTA, Mr. ROBERTS, Mr. STENHOLM, Mr. SWIFT, and Mr. WHITEHURST) introduced the following bill; which was referred to the Committee on Agriculture

---

A BILL

To amend the Plant Variety Protection Act (7 U.S.C. 2321 et seq.) to clarify its provisions, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 1 (7 U.S.C. 2321) of the Plant Variety Protection Act is amended by striking the words "a bureau" and inserting in lieu thereof the words "an office".

SEC. 2. Section 5 (7 U.S.C. 2325) of such Act is hereby repealed.

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SEC. 3. Section 8 (7 U.S.C. 2328) of such Act is amended by striking the word "officers" and inserting in lieu thereof the word "examiners".

SEC. 4. Section 9 (7 U.S.C. 2329) of such Act is amended by striking the words "published specifications" and inserting in lieu thereof the word "descriptions" and by striking "and a file of such other scientific and technical information as may be necessary or practicable".

SEC. 5. Section 10(a)(1) (7 U.S.C. 2330(a)(1)) of such Act is amended by striking the words "specifications for plant variety protection" and inserting in lieu thereof the words "descriptions of plant varieties protected".

SEC. 6. Section 10(b) (7 U.S.C. 2330(b)) of such Act is hereby repealed.

SEC. 7. Section 10(c) (7 U.S.C. 2330(c)) of such Act is redesignated as 10(b) and is amended by striking the words "the useful arts" and inserting in lieu thereof the words "plant breeding".

SEC. 8. Section 10(d) (7 U.S.C. 2330(d)) of such Act is redesignated as 10(c) and is amended by striking from the second sentence each time it appears the word "specifications" and inserting in lieu thereof the word "descriptions".

SEC. 9. Section 11 (7 U.S.C. 2331) of such Act is amended by striking the word "specifications" and inserting in lieu thereof the word "descriptions".

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SEC. 10. Section 31 (7 U.S.C. 2371) of such Act is amended by striking all after the first sentence and inserting the following: "Such fees shall be deposited into the Treasury as miscellaneous receipts. There are hereby authorized to be appropriated such funds as may be necessary to carry out the provisions of this Act.".

SEC. 11. Section 52(3) (7 U.S.C. 2422(3)) of such Act is amended by striking the last sentence.

SEC. 12. Section 56 (7 U.S.C. 2426) of such Act is amended by changing the period at the end of the second sentence to a comma and adding the following: "the name of the applicant, and whether the applicant specified that the variety is to be sold by variety name only as a class of certified seed.".

SEC. 13. Section 57 (7 U.S.C. 2427) of such Act is amended by inserting after the phrase "for the publication of" the words "information regarding".

SEC. 14. Section 83(b) (7 U.S.C. 2483) of such Act is amended by deleting the term "seventeen years" in the first sentence and inserting in lieu thereof "eighteen years".

SEC. 15. Section 84 (7 U.S.C. 2484) of such Act is amended to read as follows:

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"Sec. 84. Correction of Plant Variety Protection Office Mistake

"Whenever a mistake in a certification of plant variety protection incurred through the fault of the Plant Variety Protection Office is clearly disclosed by the records of the Office, the Secretary may issue a corrected certificate of plant variety protection, stating the fact and nature of such mistake, without charge. Such certificate of plant variety protection shall have the same effect and operation in law on the trial of actions for causes thereafter arising as if the same had been originally issued in such corrected form.".

SEC. 16. Section 85 (7 U.S.C. 2485) of such Act is amended by deleting "certificate of" from the heading, by inserting before the word "certificate" the second time it appears therein the word "corrected" and by striking the words "of correction in the manner and with attachment of copies as in section 84".

SEC. 17. Section 91(b) (7 U.S.C. 2501(b)) of such Act is amended by striking the word "specification" in the second sentence and inserting in lieu thereof the word "description".

SEC. 18. Section 93(a) (7 U.S.C. 2503(a)) of such Act is amended by striking the word "specification" and inserting in lieu thereof the word "description".

SEC. 19. Section 127 (7 U.S.C. 2567) of such Act is amended by striking the phrase "the words 'Propagation

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Prohibited'" and inserting in lieu thereof the phrase "either the words 'Unauthorized Seed Multiplication Prohibited' or the words 'Unauthorized Propagation Prohibited'".

SEC. 20. Section 128(a)(3) (7 U.S.C. 2568(a)(3)) of such Act is amended by adding the word "either" following the words "propagation prohibited" and inserting in lieu thereof the words "'Unauthorized Seed Multiplication Prohibited' or 'Unauthorized Propagation Prohibited'" and by striking the words "a statement of this basis being promptly filed with the Secretary if the phrase is used beyond testing and no application has been filed.".

SEC. 21. Section 144 of such Act is deleted.

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DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

May 14 1979

Honorable Thomas S. Foley
Chairman, Committee on Agriculture
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

This is in reply to your request of February 8, 1979, for a report on H.R. 999, a bill "To amend the Plant Variety Protection Act (7 U.S.C. 2321 et seq.) to clarify its provisions, and for other purposes."

This Department recommends that the bill be enacted with minor modifications to sections 15, 16, and 20, as outlined in the enclosed statement. H.R. 999 is identical to legislation submitted by the Department on October 10, 1978. However, since that time the Department believes that additional clarity is needed in sections 15, 16, and 20.

The Plant Variety Protection Act (PVPA), approved December 24, 1970, as P.L. 91-577, is a plant "patent" law administered by the Plant Variety Protection Office of the Department's Agricultural Marketing Service. The PVPA provides for the issuance of "certificates of plant variety protection" to developers of novel varieties of sexually reproduced plants to assure them exclusive rights to sell, reproduce, import or export such varieties, or use them in the production of hybrids or different varieties, for a period of 17 years. The PVPA is a voluntary statute.

Based on experience since implementation of the Act after its passage in 1970, we believe there is a need to amend the Act to refine and update its provisions.

The legislation, which is primarily technical in nature, would refine and update certain terminology in the Act. It would also extend from 17 to 18 years the period of time during which developers of novel varieties of sexually reproduced plants have exclusive rights to sell, reproduce, import or export such varieties, or use them in the production of hybrids or different varieties. This proposed 1-year extension of the grant of plant variety protection rights is made to be in accord with the International Union for the Protection of New Varieties of Plants (UPOV) should the United States decide to become a member in the future. The bill would also allow publication of the name of an

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applicant for plant variety protection and whether the applicant specified that the variety is to be sold by variety name only as a class of certified seed. The failure to allow automatic publication of (1) the name of the applicant and (2) whether the variety is to be sold by variety name only as a class of certified seed has required the Plant Variety Protection Office to request express permission from each applicant for such publication. Permission is not always received. This creates confusion for farmers and seed certification agencies because of labeling requirements, certification requirements, applicability of the grower's exemption and the question of private suits for infringement versus violation of Title V of the Federal Seed Act. Section 19 would permit, but not require, more specific labeling for the information of the purchaser. Further, the bill would repeal section 144 of the Act which exempts six canning vegetables--namely, okra, celery, peppers, tomatoes, carrots, and cucumbers--from coverage under the Act. We support repeal of section 144 since we feel that breeders of the six currently exempted crops who may wish to develop them for sale should be permitted, if they so desire, the same protection as in the case of all other crops protected under the Act.

The legislation would not result in any increased costs to the Department.

Enactment of this legislation would have no significant impact on the quality of the environment and no significant regulatory or economic impact.

The Office of Management and Budget advises that there is no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely,

Jim Williams

Jim Williams
Acting Secretary

Enclosures

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Recommended Modifications to H.R. 999

Section 15 should be revised to read as follows:

Sec. 15. Section 84 (7 U.S.C. 2484) of such Act is amended to read as follows:

"Sec. 84. Correction of Plant Variety Protection Office Mistake.

"Whenever a mistake in a certificate of plant variety protection incurred through the fault of the Plant Variety Protection Office is clearly disclosed by the records of the Office, the Secretary may issue a corrected certificate of plant variety protection, stating the fact and nature of such mistake, without charge. Every such corrected certificate of plant variety protection shall have the same effect and operation in law as if the same had been originally issued in such corrected form."

Section 16 should be revised to read as follows:

Sec. 16. Section 85 (7 U.S.C. 2485) of such Act is amended by deleting "Certificate of" from the heading, by inserting before the word "certificate" the second time it appears therein the word "corrected" and by striking the words "of correction in the manner and with attachment of copies as in section 84", and by amending the last sentence to read as follows: "Every such corrected certificate of plant variety protection shall have the same effect and operation in law as if the same had been originally issued in such corrected form."

Section 20 should be revised to read as follows:

Section 128(a)(3) (7 U.S.C. 2568(a)(3)) of such Act is amended to read:

"Use of either the phrase 'Unauthorized Seed Multiplication Prohibited' or 'Unauthorized Propagation Prohibited" or similar phrase without reasonable basis. Any reasonable basis expires one year after the first sale of the variety except as justified thereafter by a pending application or a certificate still in force."

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Mr. DE LA GARZA. First, let me apologize for the delay in starting the hearing. As all of you know, the House is in session. We have had two votes since the time we were originally scheduled to convene. So, that is the reason for the half-hour delay.

I might also inform our guests and witnesses that the House continues in session. There is always a possibility we may have to recess for periods of time to attend to votes on the floor of the House.

The first witness we have this afternoon is Mr. Bernard Leese of the Agricultural Marketing Service, U.S. Department of Agriculture. He is accompanied by Ms. Barbara Schlei, Administrator.

We welcome you. We will be very happy to hear from you at this time.

STATEMENT OF BERNARD LEESE, COMMISSIONER, PLANT VARIETY PROTECTION OFFICE, LIVESTOCK, POULTRY, GRAIN AND SEED DIVISION, AGRICULTURAL MARKETING SERVICE, U.S. DEPARTMENT OF AGRICULTURE; ACCOMPANIED BY BARBARA SCHLEI, ADMINISTRATOR

Ms. SCHLEI. Thank you, Mr. Chairman.

Mr. Chairman, Mr. Bernard Leese, who is the Commissioner of the Plant Variety Protection Office, would like to have the honor of presenting the testimony before you this afternoon.

Mr. DE LA GARZA. Thank you very much. We will be very happy to hear from you, Mr. Leese.

Mr. LEESE. Thank you, Mr. Chairman and members of the subcommittee and staff.

It is a pleasure to appear before you today to discuss H.R. 999 and H.R. 2844, identical bills, "To amend the Plant Variety Protection Act to expand protection to six important vegetables, clarify its provisions, and for other purposes."

The U.S. Department of Agriculture recommends that the bill be enacted.

I would like to furnish some background information on the Plant Variety Protection Act as an introduction to the proposed amendments that are before your subcommittee. The Plant Variety Protection Act was signed into law December 24, 1970. At the time the law was before Congress, two canning companies objected to the law based on the fear that the legislation would increase the cost of raw vegetables and therefore increase the cost of their products.

As a compromise, six vegetables that were important to these canning companies were excluded from the act. Since then, the canning companies have found that the Plant Variety Protection Act has not affected the cost of raw products. Consequently, these companies do not object to the repeal of section 144 of the act in order to allow the six vegetables the same protection as all other seed reproduced crops.

The Plant Variety Protection Act is based upon five principles. One, all applications and participation shall be voluntary; the breeder may choose whether to release a new variety without applying for protection. Two, the protection of the variety shall be based upon novelty. Three, no performance test is required of the new variety. Four, the act shall not interfere with the release,

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distribution and free exchange of germ plasm. Five, protection of the rights shall be the responsibility of the owner except when the owner requests Title V protection under the Federal Seed Act.

Since the inception of the Plant Variety Protection Office, it has received a total of 980 applications for 79 distinct crops and has issued 632 certificates of protection. Seventy-eight applications have been received from foreign countries, 107 from experiment stations, and 795 from private breeders in the United States. Of these 980 applications, 197 were received from the six largest U.S. companies—namely, Asgrow, Burpee, Ferry-Morse, Keystone, Northrup King, and Pioneer. We have noted an increase in the number of breeders developing new varieties since the act has been placed in force. There has also been an increase in the number of varieties developed. For example, between 1953 and 1970, 50 wheat varieties were released by public agencies. Since the Plant Variety Protection Act has been in force, 1971 to 1978, 54 wheat varieties were released. Of these 54 varieties, 23 have received a certificate of protection.

The world's first computer system to identify plant characters was developed by our office for the examination of applications. We rely upon published descriptions of previously released varieties from all parts of the world which are copied on a standard description form and transferred to the computer for storage. When applications are filed for new varieties, they must be described by the same standard form.

Using the standard descriptions stored in the computer file, the comparison of pertinent germ plasm, or characters, between previously released varieties and new varieties can be made by computer. After the background information for each crop is stored in the computer, the search for novelty of a particular variety is relatively simple. We have over 14,000 plant variety descriptions of 79 crops now in the computer.

This new concept is the first organized system for preserving variety descriptions by use of standardized forms and the use of a computer for retrieval and search purposes. The system is attracting worldwide attention because it is less costly, more rapid, more objective, and will preserve variety descriptions in a standard format for posterity. Not only do we have a complete description of the genetic resources contained in these new varieties but the seeds of these varieties are stored and maintained in our National Seed Storage Laboratory at Fort Collins, Colo.

The bill before the subcommittee was reported on by the Department of Agriculture to the Honorable Thomas S. Foley, chairman of the Committee on Agriculture, on February 22, 1979.

The bill provides for clarification or strengthens existing provisions of the act. It repeals or reduces obsolete requirements and makes six additional important vegetable crops eligible for plant variety protection. These crops are okra, celery, pepper, tomato, carrot, and cucumber.

Twelve of the twenty-one sections propose to clarify wording and make no substantial change in the requirements. These are sections 1, 3, 4, 5, 7, 8, 9, 10, 13, 15, 17, and 18. Four sections would delete or alter, obsolete requirements. These are sections 2, 6, 11 and 16. Sections 12, 14, 19, 20 and 21 provide for changes in the

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present requirements. We would be happy to expand on the sections which delete, alter, or expand the present requirements.

Section 2 would delete section 5 of the act removing the requirement that employees give surety bonds. The deletion is in keeping with legislation enacted by the 92d Congress which prohibited Government agencies from requiring or obtaining surety bonds for their employees and made the Federal Government a self-insurer. [Public Law 92-310, 31 U.S.C. 1201 et seq.]

Section 6 would delete section 10(b) of the act removing the provision for the Plant Variety Protection Office to print headings for photolithography. The provision in section 10(b) serves no purpose in our operations since we print no photographs.

Section 11 removes an unnecessary possible amendment to applications. This section of the act has not been used and is not needed as the Department now requires, under section 180.6 of the rules of practice, a deposit of seed as part of the application for plant variety protection. This requirement is consistent with the requirements of the International Union for the Protection of New Varieties of Plants—UPOV. The deposit of seed as part of the application is needed, not only to aid the examiner to determine if the variety is distinct and uniform as required by the act, but also to maintain the identity of the germ plasm.

Section 16 would provide for reissuing a corrected certificate rather than a certificate of correction when a correction was necessary through a mistake not the fault of the Plant Variety Protection Office. This would amend section 85 of the act to correspond to section 84.

Section 12 provides for publishing the applicant's name without regard to whether he grants permission in his application. We are required to request and obtain the applicant's permission to publish their names in the official journal. We have found that the use of the applicant's name with the name of the variety has increased the usefulness of our official journal to inform the public and the certification agencies. This gives the public a source of obtaining additional information.

Section 14 would extend the period of rights to be granted from 17 to 18 years to conform with other countries with breeders rights laws and with the requirement of UPOV which the United States may join. The so-called UPOV convention is a multilateral agreement whose basic objective is the protection of plant breeders' rights. This convention was revised in October 1978 with a view to encouraging the adherence of the United States and a number of other important nonmember States. The Departments of Agriculture, Commerce, and State strongly favor adherence of the United States to the UPOV convention in order to facilitate and strengthen the protection of the American plant breeders' rights abroad.

Section 19 would permit, but not require, more specific labeling for the information of the purchaser or consumer. This change would clarify that only "unauthorized reproduction is prohibited," rather than the phrase "reproduction prohibited," since all seed is intended for reproduction of the variety.

Section 20 would amend the prohibition section of the act to correspond to the labeling permitted in section 19. This would delete a requirement for a report to be made to the secretary on

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the basis for using the phrase "propagation prohibited" or similar wording when application for protection is contemplated. If the phrase is used beyond testing, the applicant would have to file an application within 1 year. During this year the owner must indicate on the label his basis for using the phrase "Unauthorized Propagation Prohibited" or "Unauthorized Seed Multiplication Prohibited"; such as "Application for Plant Variety Protection Contemplated."

Section 21 would delete the current exemptions in the act for the six vegetables, which were previously barred from protection. This would provide to breeders and developers of these crops, if desired, the same protection afforded all other crops protected under the act.

Mr. Chairman, this concludes my overview of the proposed amendments to the Plant Variety Protection Act. I will be happy to respond to any questions you may have.

Mr. DE LA GARZA. Thank you very much, Mr. Leese.

Mr. Schlei, do you have a statement or any comment?

Ms. SCHLEI. No, sir, but I would be happy at this time or at any time during the hearings to answer any questions that you or the subcommittee might have.

Mr. DE LA GARZA. Thank you very much.

Mr. Wampler?

Mr. WAMPLER. I have no questions at this time, Mr. Chairman.

Mr. DE LA GARZA. Mr. Skelton?

Mr. SKELTON. Ms. Schlei, where did this bill originate?

Ms. SCHLEI. The amendments, sir?

Mr. SKELTON. Yes.

Ms. SCHLEI. They were drafted by our office.

Mr. SKELTON. Under your direction?

Ms. SCHLEI. Yes, sir.

Mr. SKELTON. Thank you, Mr. Chairman.

Mr. DE LA GARZA. Ms. Schlei, we have had some concern expressed to us that this legislation would result in less research on variety development by affecting small seed companies and, in effect, giving a monopoly to big corporations. The Plant Variety Protection Act has been in effect since 1970.

Could you give us your perception as to what effect it has had, if any, along those lines during that time?

Ms. SCHLEI. Mr. Chairman, my perception would be exactly the contrary. First, from a philosophical point of view, I think that when you motivate people through a free enterprise system to develop new and improved varieties, to increase the quality and variation of the crops that we have available and give them an opportunity to protect the cost of that research, then this should increase the amount of research that is devoted to the development of new varieties.

Our experience to date seems to bear out that theoretical conclusion. Of the 980 applications that we have received to date, more than 700 of them have been from either experiment stations or from these smaller companies. Of the 797 applications that we have received to date from the American private sector, some 600 were received from the smaller companies, and only 197 were received from the larger companies.

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In addition, we have seen an extraordinary increase in the number of varieties to come on to the market. For example, in the area of wheat, during the 17 years prior to the enactment of the legislation, only 50 new varieties of wheat came onto the market; whereas, during the 7 years since the passage of the Plant Variety Protection Act, 54 new wheat varieties have come onto the market.

Mr. SKELTON. Mr. Chairman, may I ask one additional question?

Mr. DE LA GARZA. The gentleman from Missouri.

Mr. SKELTON. This is a very new area for me. Can you take me step by step through the process of a new application to its final determination and also tell me how long it takes from the application beginning to the final approval?

Ms. SCHLEI. We receive applications either informally or on our standard form. Where they do not come on our standard application form, we then go back to the person submitting the application and request that the material——

Mr. SKELTON. Assume it came in on the form.

Ms. SCHLEI. The form would come in along with the supporting seed. We would then look over the form and make sure that it was complete and accurately filled in. At that point we would go to our computer bank for that crop.

We are looking at a total of about 331 crops. We currently have about 70 crops on the computer. Assuming this was one of the 70 crops, we would not have to manually search the literature. For some crops such as sorghum we might have 1,000 varieties listed on the computer. Enormous amounts of time had previously been taken up in reviewing the literature for those 1,000 varieties of sorghum. Instead, we would take the attributes, the specific characteristics of this new variety as described by the breeder, put those into the computer, and the computer would search to find out any known varieties that had similar characteristics.

That would probably bring us down, from 1,000, to maybe three or four sorghum varieties that were known to have similar attributes. We would then do a very detailed study of those known varieties to see whether the variety submitted to us was in fact a distinct variety, that it truly was a novel variety.

We would then also look at the variety to examine the question of stability and, of course, uniformity of the variety.

If we were satisfied concerning those factors, that would be the basis upon which a certificate could be approved. We do not attempt in this program to evaluate or quantify the variety or place a grade in any way upon the variety. We look solely to the questions of, is it novel, is it stable, is it uniform. If it meets those qualities, without making a value judgment, we would then be prepared to grant a certificate as to that variety.

That would take approximately 3 months, assuming that we had all the information, that the form was properly filled in, and that the variety and the crop were on the computer. We would then take the germ plasm for that variety and send that to Fort Collins along with a description that would be permanently in the computer bank. So, we would be preserving both the description of the variety for additional research purposes and for future identification as compared to other varieties and also preserving the genetic material of this variety in Fort Collins.

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Mr. SKELTON. Thank you so much.

Mr. DE LA GARZA. May I ask along that line whether a protected variety be used for breeding new varieties?

Mr. LEESE. I should like to address this question. Mr. Chairman, this is possible. There is a difference between developing and producing a new variety. But the germ plasm from a protected variety can be combined with another variety, and the offsprings of that can be increased in producing a new variety.

Therefore, you do not lock up, so to speak—I have heard the term, lock up genetic material. You do not lock up genetic material by protecting a variety because its use for germ plasm is available to anybedy that wants to breed with another specific characteristics of a variety in developing new varieties on the market.

Mr. DE LA GARZA. Then the question that you do not lock up a genetic variety—do I understand that correctly?

Mr. LEESE. That is right, you do not. The variety that you are using previously can be used in its original state. The variety that you produced from the germ plasm of that original variety in producing a new variety would be able to be used also. Therefore, the germ plasm contained in a protected variety is not restricted for use in developing a new variety.

So, you do not restrict any genetic material at all into increasing new varieties for the marketplace.

Mr. DE LA GARZA. Thank you very much.

Mr. Grassley?

Mr. GRASSLEY. Thank you, Mr. Chairman.

For the benefit of the discussion on this bill, I want to read into the record parts of a letter that has been circulated around the country. I think it raises some questions that not only you but many people testifying here today can speak to. Then I will not have to ask the questions of everybody that comes up.

Mr. DE LA GARZA. Would you kindly identify the letter?

Mr. GRASSLEY. No; I do not want to identify it.

From that standpoint then, just let me say that I am reading from a sheet of paper.

Earlier this year you ordered a copy of a publication. When we began distributing the publication, we had no idea there was a bill pending before Congress that was potentially very harmful to the preservation and promotion of our seed and genetic resources. As someone appreciative of the value of traditional seed varieties and concerned about their preservation, we thought you would like to know more.

Next week the House Agriculture Committee will hold hearings on a seemingly innocent bill, H.R. 999, to amend the Plant Variety Protection Act. In the Senate this bill is known as S. 23. We on the staff are hard at work mounting opposition to this amendment. We need your help. Here are the facts:

The 1970 Plant Variety Protection Act established a system allowing seed companies to obtain 17-year patents on new varieties they develop. The amendment, H.R. 999 and S. 23, we are concerned about would add six vegetables—tomatoes, carrots, celery, peppers, cucumbers and okra—

and at this point let me say parenthetically I was reading the bill here, and I see no references to these; so, I do not know even whether this letter is accurate—

to the list of plants that could be patented.

Passage of this amendment would allow the United States to join an international agency dominated by European governments established to promote, coordinate and standardize these laws around the world.

What is the European experience with plant patenting laws? In Europe, enforcement of similar patenting laws has proven to be a legal jungle. It is almost impossi-

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ble to prove in court that "your tomato is genetically identical to my patented variety." In order to prevent confusion with patented varieties, the Common Market countries have simply outlawed many unpatented plants. Farmers are actually being fined for growing these illegal varieties.

Dr. Erna Bennett of the U.S. Food and Agriculture Organization in Rome estimates that by 1991, fully three-quarters of all the vegetable varieties now grown in Europe will be extinct due to this attempt to enforce patenting laws. This could happen here.

Genetic diversity is the key to the survival of our food supply. It is agriculture's primary defense against pests, diseases, and changing environmental conditions. Without this diversity of plant varieties, agriculture is threatened. Genetic material from the old varieties is constantly needed for breeding resistance and adaptability back into the modern, inbred varieties. According to the National Academy of Sciences, many of our food crops are now impressively vulnerable due to their lack of genetic diversity.

As you know from reading the publication, we fear that similar patenting laws in the United States will discourage the preservation of old varieties and lead to their extinction. We also believe that patenting legislation can destroy small seed companies like those listed in this publication.

Patents give a monopoly to their owners. This could give big seed companies the opportunity to raise their prices to the gardener and farmer. Recently, as the seed industry has become more profitable, it has become a target for takeovers, principally by large chemical and drug corporations. Purex now owns Ferry-Morse, Sandoz owns Northrup-King, and ITT has just bought Burpee from General Foods. The result is increased concentration in the seed industry, lessened competition and higher prices.

Smaller seed companies lack the resources to employ scientists to develop patentable varieties. They are being forced out of business as the market becomes dominated by a small number of varieties whose patents are held by multinational corporations.

It lists six points:

In brief, here are our basic concerns:

One, establishing laws to patent forms of life raises serious moral and ethical questions and may establish dangerous precedents for future laws.

Two it is outrageous to amend our laws to make it possible for the United States to join an organization—UPOV—whose members outlaw certain varieties of vegetables. For this privilege the initial membership fee will cost U.S. taxpayers nearly $100,000.

Three, the difficulty of enforcing plant patenting laws led the European Common Market nations to establish a system of illegal vegetables. Opposing this amendment is the first step that we can take to see that this does not happen here.

Four, patenting laws encourage concentration in the seed industry. Small seed businesses are being taken over by large pesticide and fertilizer companies.

Five, patents allow seed companies to jack up prices. That means inflation.

Six, patenting laws benefit only the big companies who hold most of the patents. Promoting their economic interests over the best interests of our agricultural system and of nature itself leads to disaster. We need to preserve seeds, not destroy them. But today, some of our preservation programs are facing budget cuts. Our government and its laws should promote conservation and diversity rather than uniformity.

That is the end of the concerns.

Now, I do not even know whether any of that is true or not. But I thought it is something that we ought to bring out for discussion as long as we were talking specifically about this bill.

So, if you have anything you want to comment on, or if any of the succeeding people do, I would like to know about that, the questions that they raise and the concerns. Even if it is not factual, I would encourage you to feel free to tear it apart, if you want to.

I do not want my reading of it to imply that I have any predilections on this bill because, quite frankly, I do not know anything about it. That is why I am here.

Ms. SCHLEI. Thank you very much, Mr. Congressman. I would be happy to have an opportunity to comment on that material.

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I am sure that the authors of the material are extremely well-intentioned, and I think that they raise some theoretically very valid concerns and concerns to which we should all properly address ourselves. However, I think those concerns are not applicable to the amendments that are before this subcommittee. In fact, I think that they are totally irrelevant to the amendments before this subcommittee.

Let me comment on each point separately.

It is correct that one of the amendments would seek to expand the term of coverage from 17 years to 18 years. It is also correct that it would expand the coverage to six vegetables which are not currently covered. That is section 14 and section 21, which the chairman mentioned in his opening remarks.

The second portion of the material that you read dealt with the European experience. I think that it is correct that the European countries have developed a system of legal and illegal seeds. That is not the system that we have in the United States. I believe that the Department of Agriculture and I believe that the seed industry itself would oppose the adoption of any similar system here in the United States. We believe that we have very knowledgeable and very competent farmers, who are capable of making their own decisions about what seed to plant. They do not need to be protected by the Federal Government telling them that certain seeds are not as productive and therefore making those seeds illegal to plant.

We believe that an able farmer can look at varieties of seeds, look at their own production needs, and make their own informed decision as to whether or not to plant those seeds.

Therefore, I think that all of the references to the European experience are irrelevant to our experience in this country, are not contemplated by these amendments, and are not contemplated by any other amendments to any other legislation to my knowledge.

The next issue raised is the question of genetic diversity. There is no question that genetic diversity is crucial to the survival of our food supply. I think all of us who work in this field appreciate the importance of genetic diversity, of continuing to preserve the germ plasm of our plant life. Just as we talk about the importance today of looking at extinct species in the animal world, we also have to look at the importance of preserving the germ plasm of our plants.

I believe that the Plant Variety Protection Act can and will increasingly play an important role in fostering the preservation of our germ plasm. One of the things that we do right now under the Plant Variety Protection Act is to put the germ plasm for each variety in our Fort Collins facility and preserve that for future use and the future development of new crops and new varieties.

This is an area in which we work very closely with the Science and Education Administration. While we put the varieties into Fort Collins, SEA puts the germ plasm into Fort Collins. This is an area of work in which we would like to expand our activity. We would be very happy and, I hope, could work constructively with the authors of this letter to enhance our efforts to continue to preserve genetic life forms.

Another point that is made here is that patents enhance the larger companies. This is a question that the chairman raised earlier and which I have already addressed.

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The next serious point made is that the amendment would make it possible for the United States to join the UPOV. It is possible for the United States to join the UPOV whether or not this amendment is passed. That is a separate and distinct issue and has nothing to do with these amendments.

The UPOV, for certain purposes, does provide patents for 18 years. It is correct that that joining by the United States would be somewhat facilitated if our patent law went from 17 years to 18 years. But that is not necessary for us to join the International Convention for the Protection of New Varieties of Plants, nor would the passage of these amendments necessitate our joining. They are two separate and distinct issues.

The next point has to do with the problems in the European Common Market nations, which I think are their problems and not related to this amendment.

The next point goes to encouraging concentration in the seed industry. Our experience, as I said, is to the contrary.

The point is raised that the seeds which are patented increase the prices of those seeds. Nobody must buy a variety which has a certificate. Every farmer in this country is free to purchase any variety of seed which they wish to purchase. If they feel that, by investing in a new variety of seed which will give them enhanced productivity, or enhanced resistance to disease, or has any other desirable characteristic, and they are prepared to pay an additional price for that seed, then it seems to me that that is a free marketplace decision that each farmer has the right to make.

They can also buy seed which is not certified seed which is available to them at a lower price. This is an independent decision by an independent farmer.

I might say on that point that our experience to date is that the granting of a certificate does not necessarily enhance the price. Certified seed is not necessarily or uniformly of a higher price than uncertified seed.

I believe that I have covered all of the points that you referred to in the paper that you read, Mr. Congressman. I would be happy to speak on any other points that I failed to cover.

Mr. GRASSLEY. I am done, I believe——

Mr. DE LA GARZA. Thank you very much. The gentleman's 5 minutes expired 10 minutes ago.

Mr. GRASSLEY. I would like to apologize to the chairman. Obviously, the source of the letter is known. But I was respecting my constituent's request that I not disclose the source of the information. But it is quite obvious to me that it is already known to the subcommittee.

I apologize to the chairman.

Mr. DE LA GARZA. There is no need for apology. It is just the practice of this subcommittee that, if we are going to interrogate any witnesses, they should have the privilege of knowing from whence the questions come. That is just a courtesy that we allow our witnesses.

Mr. Wampler, do you have a further question?

Mr. WAMPLER. Very briefly, Mr. Chairman. I realize we have a long list of witnesses.

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Mr. Leese, in your statement you refer to not only the fact that you maintain a complete description of the genetic resources contained in the new varieties but also that the seeds of these varieties are stored and maintained in our National Seed Storage Laboratory at Fort Collins, Colo.

For my own edification and perhaps for that of other members of the subcommittee, could you tell me a little bit more about that? What quantities of seeds do you store there?

Mr. LEESE. To bring you up to what is required by an application, when an applicant applies for protection, there are certain requirements that must be met. One of those is that he furnishes 2,500 viable seeds. Also, the requirement is that they will be replenished when they need to be in case the viability decreases.

So, we have a genetic check on the variety that is being protected. Also, the genetic material is available at the Fort Collins National Seed Storage Laboratory. Every 5 years or so, the Fort Collins National Seed Storage Laboratory makes a germination check on the seed. It depends upon the crop, but an ideal count for germination is 400 seed. They determine whether the seed should be replaced, whether viability is going down or not, and whether we need a replacement of the seed.

Mr. WAMPLER. Are they stored in facilities that would withstand, say, the effects of a nuclear attack or fallout or other catastrophes of that type?

Mr. LEESE. No; they are not. The National Seed Storage Laboratory was built in 1952, when new crops research was responsible for housing germ plasm under the plant exploration program. At that time, they were concerned with the climatic conditions or environmental conditions in storing seed for long periods of time. But there are not any facilities like you indicate.

Mr. WAMPLER. Is this being done by any private organization that you know of or other agencies of Government, reserving against that possibility?

Mr. LEESE. I believe CIMMYT is doing this. I am not quite sure.

But there are storages of germ plasm all over the world. The Rockefeller Foundation is storing germ plasm of sorghum in India. The wheat materials are stored in Mexico. There are smaller storages of the different major crops all over the world: Rice in Taiwan. We do have storage facilities for different major crops throughout the world.

Mr. WAMPLER. Thank you, Mr. Chairman.

Mr. DE LA GARZA. How large are the physical facilities where you do the storing?

Mr. LEESE. The storage at Fort Collins, I would guess, is something like a 168-by-54 structure. It has three floors: A basement, first floor, and second floor. Most of the material is stored in airtight containers the size of a quart can up to a gallon can. This material is also stored under different relative humidity conditions and temperature conditions to maintain viability.

Ms. SCHLEI. Mr. Chairman, I might add the fact that the Department through SEA is also storing germ plasm in this facility. In addition, while at the moment under the Plant Variety Protection Act, we are only storing the seeds for varieties for which certification is granted, we would like to expand this program to store seed

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for all of the known varieties matching the variety descriptions that we have on the computer. So, we would go back into these 15,000 varieties and match up the seed, at least the seed that has been current during the past 10 years, and try to keep that in the Fort Collins facility.

Mr. DE LA GARZA. Thank you.

Ms. SCHLEI. I think the essence of what I am saying is to try to express our deep concern with the issue of preserving genetic material and the fact that we would like to work very closely and actively in this field and cooperate with all of the good people that share our interest in this area.

Mr. DE LA GARZA. Thank you very much. We thank both of you for being here.

You are welcome to stay but if you have other matters to attend to, it would be perfectly agreeable with us if you would like to retire.

Ms. SCHLEI. Thank you, Mr. Chairman. We appreciate the opportunity to testify before the subcommittee. We would very much enjoy staying for the remainder of the hearings.

Mr. DE LA GARZA. Thank you very much. We welcome you to do so.

Mr. LEESE. Thank you, Mr. Chairman.

Mr. DE LA GARZA. Our next witness is Mr. James Chaney of the Keystone Seed Co.

STATEMENT OF JAMES W. CHANEY, PRESIDENT, KEYSTONE SEED CO., HOLLISTER, CALIF.

Mr. CHANEY. Thank you, Mr. Chairman and members of the subcommittee. My name is James W. Chaney. I am the president of Keystone Seed Co., Hollister, Calif. Our company is a vegetable seed company. We deal in many kinds of vegetable seeds. I am the immediate past president of the American Seed Trade Association. The American Seed Trade Association represents 550 seed firms in the United States, 65 State and regional associations and, I believe, the industry at large. My company is also a member of the National Council of Commercial Plant Breeders.

Mr. Chairman, you have my written testimony. I would only like to amplify it by saying that in the beginning, when this Plant Variety Protection Act was enacted in 1970, our industry stated that many benefits would accrue from passage of this act. At this time, 9 years later, I can say that these benefits have been realized; and new varieties developed by private enterprise and private funds have contributed to the improvement of American agriculture, particularly to the customers of the products of U.S. farms.

Conversely, many fears were expressed prior to enactment of the Plant Variety Protection Act. I would say that these fears have not been borne out at this time. Therefore, the American Seed Trade Association strongly supports H.R. 999. We support the various housekeeping proposals of this bill recommended by the USDA as being necessary to bring the act into line actual practices in the office. As a breeder of vegetable seed, I particularly support the provision that would eliminate section 144 of the act and extend protection to okra, celery, pepper, tomato, carrot, and cucumber. Our firm does not currently invest our research dollars in variety

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development programs for any of these six crops except on the development of hybrid varieties, for which protection is not needed. Prudent business judgment requires investment of funds for the development of varieties of other crops such as lettuce, beans, onion, and cabbage, which can be protected and from which we can expect a return. We look forward to the possibility that we can initiate breeding programs in several of those crops presently exempt from the Plant Variety Protection Act.

Mr. Chairman, we sell on a high competitive market, and we sell results. In order to get results, we must have research.

Mr. Chairman, I appreciate the privilege of presenting these comments on an important amendment to the Plant Variety Protection Act. Thank you.

Mr. DE LA GARZA. Thank you very much, sir. We appreciate your cooperation in summarizing your statement.

Our next witness will be Dr. Henry Fortmann of Pennsylvania State University.

Without objection, your statement, Mr. Chaney, will be inserted in the record.

[Prepared statement of Mr. Chaney follows:]

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STATEMENT OF

James W. Chaney, President
Keystone Seed Company

BEFORE THE
HOUSE AGRICULTURE SUBCOMMITTEE ON
DEPARTMENT INVESTIGATIONS, OVERSIGHT, AND RESEARCH
ON H.R. 999 AND H.R. 2844
JULY 19, 1979

MR. CHAIRMAN: My name is James W. Chaney. I am the president of Keystone Seed Company, a company headquartered in Hollister, California. We develop, produce and sell many kinds of vegetable seeds. I am the immediate past president of the American Seed Trade Association which represents over 550 seed companies, 65 state and regional associations and we believe the seed industry at large. My company is also a member of the National Council of Commercial Plant Breeders.

When the Plant Variety Protection Act was enacted in 1970 the seed industry presented testimony in support of the legislation stating that the following benefits could be expected from providing such protection:

1. It would greatly stimulate private plant breeding.
2. It would allow our government agricultural experiment stations to increase their efforts on needed basic research.
3. It would permit public expenditures for applied plant breeding to be redirected to important areas which industry is unable to pursue.
4. It would give farmers and gardeners more choice, and varieties which are better in yield, in quality, or other important characteristics.

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5. It would make American agricultural products more competitive in world markets.
6. Consumers and other purchasers of crops would benefit: in some instances by improved quality, in others by aiding the production needed to serve them.

These benefits have been realized and new varieties developed by private enterprise and private funds have contributed to the improvement of American agriculture and particularly to the consumers of the products of U.S. farms.

I would like to use the developments in one crop, soybeans, to illustrate the benefits of the Plant Variety Protection Act. A recent survey by the National Council of Commercial Plant Breeders identified 25 private research programs dedicated to soybeans. Only one of these is more than 12 years old which strongly suggests that the new commercial soybean breeding industry is a direct product of the Plant Variety Protection Act. Plant Variety Protection Certificates have been issued on 120 new soybean varieties. The 1970 legislation has not only resulted in soybean farmers having a greater choice of new and better varieties with which to produce higher yields, but of greater importance, the primary benefactors of these developments are the consumers who purchase the wide range of products produced from soybeans.

I would like to address one other subject in a general way, that being some of the fears which were expressed prior to the enactment of the Plant Variety Protection Act. First, some critics said it would concentrate the seed industry in the hands of a few large companies who could afford research programs. This has not been the case, there are as many, or more, seed companies now than ever, and of particular importance, many smaller

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firms have initiated research programs either independently or in a cooperative effort with other small firms. Some critics said that plant variety protection would result in less competition and therefore higher prices. This has not been the case, competition has increased and under our free enterprise system this competition serves to regulate the marketplace. Lastly, other critics were concerned about the effect on germ plasm exchange and preservation. Plant variety protection has the benefit of serving as the most effective means we have to preserve germ plasm. Diversity of germ plasm is the primary basis of plant breeding programs and the Plant Variety Protection Act has increased efforts, both public and private, in the collection, preservation and utilization of germ plasm.

The American Seed Trade Association strongly supports H.R. 999 and H.R. 2844. We support the various housekeeping proposals in this bill recommended by the USDA as being necessary to bring the Act into line with actual practice in the Office. As a breeder of vegetable seed, I particularly support the provision that would eliminate Section 144 of the Act and extend protection to okra, celery, pepper, tomato, carrot and cucumber. Our firm does not currently invest our research dollars in variety development programs for any of these six crops, except on the development of hybrid varieties for which protection is not needed. Prudent business judgment requires investment of funds in development of varieties of other crops such as lettuce, beans, onions, and cabbage which can be protected and from which we can expect a return. We look forward to the possibility that we can initiate breeding programs in several of those crops presently exempt from the Plant Variety Protection Act.

Mr. Chairman, I appreciate the privilege of presenting these comments on these important amendments to the Plant Variety Protection Act.

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STATEMENT OF HENRY R. FORTMANN, CHAIRMAN, SEED POLICY SUBCOMMITTEE, EXPERIMENT STATION COMMITTEE ON ORGANIZATION AND POLICY

Mr. FORTMANN. Thank you, Congressman de la Garza. I appreciate very much the opportunity to appear before your committee to present a very brief statement pertaining to proposed amendments to the Plant Variety Protection Act, Public Law 91-577. My name is Henry Fortmann. I appear before you as chairman of the Seed Policy Subcommittee of the Experiment Station Committee on Organization and Policy—known as ESCOP. I think both you and Congressman Wampler are well familiar with that committee of the State Experiment Stations. There are 56 of them. Dr. Jarvis Miller and Dr. Neville Clarke are two people at Texas A. & M. that know you very well, Congressman de la Garza, and respect you, I think, as much as I hope you respect them. And there are Mr. Wilson and Jim Nichols at V.P.I., Congressman Wampler. I do not know the other Congressmen and Congresslady up here, or I would make reference to the people that you represent. I am professor of Agronomy at the Pennsylvania State University and am now and have been for the last 12 years the regional coordinator for the 15 State Agricultural Experiment Stations in the 12 Northeastern States. Before I became involved in administrative matters, I was the forage crops breeder at Penn State.

During the 15 years preceding passage of Public Law 91-577 in 1970, I was deeply involved in the extensive public and private dialog about the potential advantages and disadvantages of passing a plant variety protection statute. And I was privileged to testify in favor of passage of this act before this committee in 1970. You were the chairman then, too, Congressman de la Garza. I have since then served two terms, 6 years, on the Plant Variety Protection Board. That is the limit that any individual is permitted to serve on the board.

I am pleased to report that, so far as I have been able to ascertain, plant variety protection has functioned effectively and smoothly in encouraging increased private plant breeding efforts in the improvement of many kinds of crops. Such improvement inevitably benefits our American farmers through improved yield, through improved quality, and through other reliability characteristics. More importantly, it benefits all American consumers because of enhanced quality and the lowest food costs of any nation in the world.

Furthermore, as the administrative advisor of one of the Northeast Regional Research Projects—N.E. 108 Breeding Cool Season Grasses—I know from personal experience that PVP has not impeded the free interchange of forage crops germ plasm. And this was one of the concerns that I was very interested in prior to the passage of the act and would not have spoken in favor of its passage had I not been assured that there would be continued free interchange of germ plasm. I do not know about all of the other kinds of crops, but, as far as I do know, this applies equally to other kinds of crop and vegetable species.

H.R. 999 would make six additional vegetable crops—okra, celery, carrot, pepper, tomato, and cucumber—eligible for plant variety protection. This action has been considered by concerned

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regional associations of State Agricultural experiment station directors. They have approved in principle this proposed action. Therefore, I recommend passage of H.R. 999 to accomplish this purpose.

There are a number of other sections in H.R. 999 which clarify existing provisions and repeal or reduce obsolete requirements. As far as I am concerned, these are administrative details which have been carefully considered by others including Commissioner Bernard Leese and Barbara Schlei. My admittedly limited study of these provisions indicates that all of the proposals are reasonable and should be approved as a part of H.R. 999. Many of them we considered at one time or another while I was serving on the board of the Plant Variety Protection Office.

I want to thank you, Congressman de la Garza, and other Congressional Representatives, for the opportunity to testify on this matter. If there are any specific questions either regarding what I have said or other testimony which has been made or will be made, I would be pleased to stay here to answer them.

Mr. DE LA GARZA. Thank you very much, Dr. Fortmann. We are privileged to have you before us again. I do not think there are any questions. We thank you for your attendance here.

One of those votes I mentioned might come up while our hearing is in progress. Therefore, we will stand in recess temporarily. We shall return as promptly as possible.

[Recess taken.]

Mr. DE LA GARZA. The subcommittee will be in order.

Our next witness is Mr. William MacDowell.

We are happy to have you, sir. We will hear from you at this time.

STATEMENT OF WILLIAM D. MacDOWELL, PRESIDENT AND CHIEF EXECUTIVE, W. ATLEE BURPEE CO.

Mr. MACDOWELL. Thank you, Mr. Chairman.

I am William D. MacDowell, president of the W. Atlee Burpee Co. I am also the immediate past chairman of the Plant Variety Protection Committee of the American Seed Trade Association.

I appreciate the opportunity of testifying before your committee today. I have submitted in writing other testimony which covers many points which I will not recover here in my verbal testimony.

The Burpee Co. has facilities in Pennsylvania, Iowa, California, and Florida. We breed, produce and market flower and vegetable seeds primarily orientated to the home gardening trade. In the past we have dedicated most of our breeding efforts to hybrids because our open pollinatod varieties have been pirated, and we have not been able to recoup our investment on that breeding investment.

We are now, however, directing considerable research efforts to developing nonhybrid varieties except for the six vegetables currently excluded by section 144 of the Plant Variety Protection Act. That is dealt with by section 21 of the proposed amendments.

I would like to address a simple issue; that is whether the Plant Variety Protection Act encourages or discourages the saving and maintenance of old-fashioned heirloom varieties which by themselves have been made obsolete by newer man-made, if you will, varieties that are either more productive, more disease resistant,

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taste different—hopefully, mostly better—are different shapes, sizes, colors, are earlier maturing or mature more uniformly, are better adaptod to certain climates or soil conditions, are resistant to insect pestilence, et cetera, et cetera.

A breeder needs a vast storage bank of germ plasm breeding material in order to combine the desirable characteristics of different varieties into a new improved variety. Without that germ plasm, the breeder does not have anything to work with. So, breeders and producers of seed are vitally interested in saving and maintaining varieties to use as building blocks in their breeding work.

I would guess that most of you are familiar with the lovely lacey wildflower called Queen-Annes-lace. What you may not know is that Queen-Annes-lace is a wild carrot. It is made of the same basic genetic stuff that the domestic carrot is made of.

I doubt very much, however, if we could get our customers to buy it as a carrot because its root is inedible. You can pull it in the wild and smell its root, and it smells like a carrot; but it is not edible. But it has certain disease resistances. The mere fact that it is able to survive in the wild says that it has a lot of strength.

That is the kind of material that is used as a building block in a breeding program. So, our breeders would want it saved. Our marketers really could not care less about it unless, however, it is used as a building block to produce a variety that the company's customers would want.

We, for example, use wild tomatoes in our breeding efforts. There are several plant explorers that we have connections with. They sell us material that they have gotten from all over the world—tomatoes, for example, from the hills of Mexico. We use those varieties which are not good varieties in and of themselves, but they are excellent to use as a breeding building block.

We were excited by the trip that a number of seed trade and university folks made to China. Dr. Gobelman of the University of Wisconsin and Dr. Roman Romanofsky of Purdue made arrangements with the Chinese to come back with some, I believe, 1,600 varieties of seeds that did not exist in the United States. Many of them, based on their own agronomic conditions, had developed disease resistance.

So, we are excited by those varieties. We cannot use them as they are because they are probably in most instances not adaptable to our growing conditions. But they can be used as building blocks.

Mr. Chairman, I believe that the ability to protect a variety encourages rather than discourages the saving of old varieties. The passage of the amendment which would eliminate the restrictive section 144 of the Plant Variety Protection Act would, in my judgment, further encourage research on the six important vegetables in question while, at the same time, encouraging the saving of heirloom varieties.

Thank you for the opportunity of testifying today.

Mr. DE LA GARZA. Thank you very much, sir.

Without objection, your prepared statement will be placed in the record.

[Prepared statement of Mr. MacDowell follows:]

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STATEMENT OF

William D. MacDowell, President and Chief Executive
W. Atlee Burpee Company

BEFORE THE
HOUSE AGRICULTURE SUBCOMMITTEE ON
DEPARTMENT INVESTIGATIONS, OVERSIGHT, AND RESEARCH
ON H.R. 999 AND H.R. 2844

MR. CHAIRMAN: My name is William D. MacDowell. I am president and chief executive officer of the W. Atlee Burpee Company, headquartered in Warminster, Pennsylvania. I would like to present the following position paper for the extension of the 1970 Plant Variety Protection Act.

The success of American agriculture in the world today is directly attributable to the fruits of past and present research centered on all areas of knowledge to attain maximum performance from the various crops we grow. The United States has undisputed leadership in agricultural production in the world today as a result of our research investment.

Burpee's business is concerned with a small but important sector of American agriculture, namely the production and sale of vegetable and flower seed for the home gardener. The success of our business has rested on the long history of Burpee's dedication to research. In the past, support for this research was limited by the company's inability to realize fully a proper return for its investment in research. Unlike other sectors of our economy, like a writer whose work could be copyrighted, or the inventor whose genius could be protected by patent, the seed researcher who invested in research had new varieties pirated by competitors who merely reproduced them without any compensation to the originator. The result has been that breeding has been directed strongly toward the development of hybrid seed, which has its own "built-in" protection, and incidentally, in most instances, a substantially higher production cost. It was a situation without parallel in American business.

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The climate for research investment by seed breeders changed with the passage of the 1970 Plant Variety Protection Act. However, the Act excluded protection on six vegetables, namely carrots, celery, cucumbers, okra, peppers and tomatoes. This exclusion was an inconsistency since no such exclusions are made on any other kind of agronomic crop. There are no such exclusions in other countries with equivalent plant protection laws. The Plant Patent Act covering asexually propagated plants contains no exclusions on certain kinds of plants.

In our judgment, there are no valid reasons for excluding these six vegetable crops other than the interest of those who stand to gain from pirating the developments and innovations of others who invest in research. In principle, this denies the tenet that a person or business is entitled to the fruits of his, her, or its labor. Research is a part of our labor. The six vegetable crops excluded are an important sector of our vegetable seed business and we fail to understand why legitimate plant variety protection is not extended to allow us to recover our research costs on these crops.

What change has the Plant Variety Protection Act made in terms of the Burpee Company? We have built a new research facility in California and equipped it properly with personnel and equipment to cope with objectives directed toward flower and vegetable varieties of superior performance for both home gardeners and commercial growers of vegetables. We have doubled our research investments and intend to increase them further. We are not encouraged to expand our research on crops excluded under the 1970 Plant Variety Protection Act. Developments on such crops can be merely regrown by competitors, leaving no incentive to plow research money in these crops.

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In our analysis of those opposed to the extension of the 1970 Plant Variety Protection Act, we find those who stand to gain from pirating new plant production development, those with no research investment, and some misinformed people who advocate perpetuation of older out-moded varieties by gardeners due to their concern about the preservation of germ plasm. Actually, no one is more concerned about the preservation of germ plasm than those seed breeders with an investment in research since these older, "Native" varieties are the building blocks for future varieties. There is a National Seed Storage Lab in Colorado charged with the preservation of germ plasm along with its counterparts in all areas of the world. We cooperate fully with these institutions as well as other agencies of the U.S. Department of Agriculture whose efforts are directed to bringing germ plasm from other areas of the world. Some misguidedly believe that extension of the Plant Variety Protection Act will result in the disappearance of the older germ plasm. Nothing could be further from the truth.

In conclusion, we as a Company, fail to see any constructive reason for the exclusion of tomatoes, carrots, celery, peppers, cucumbers and okra from the 1970 Plant Variety Protection Act. Protection of these varieties will result in greater research expenditures toward the objectives of disease and insect resistance, improved yield, and those other qualities which will provide consumers with more and better food.

Mr. Chairman, I appreciate the opportunity of presenting these comments on these important amendments to the Plant Variety Protection Act.

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Mr. DE LA GARZA. Mr. Wampler has a question.

Mr. WAMPLER. Thank you, Mr. Chairman.

Mr. MacDowell, I want to thank you for your statement and for your presence here.

On page 2 of your prepared statement in the second paragraph, you say research is a part of our labor. I think you did elaborate on that. If it is not a trade secret, could you tell me generally how much or what percentage of your total operating budget you spend on research each year? Would it be substantial?

Mr. MACDOWELL. Yes.

It is not necessary to do this in our end of the seed business. For example, we are the leading marketers of seeds by mail. The other seed marketer by mail—there is only one as a matter of fact—does have a breeding program. So, we would not have to do it if we did not want to, if we did not feel it was a good thing to do.

We have a breeding facility in Santa Paula, Calif. We have a trial grounds facility in Doylestown, Pa. I will give you the budget number. It is a very small number compared to the budget of the United States, but to us it is significant. We spend, just trialing our products, about a half a million dollars. In addition to that, we have a breeding staff, when one includes technical support, of about 15.

So, yes, breeding and research expense are a major expense of the Burpee Co. It is something that, if we did not do, we would be more profitable in the short term but not more profitable, in my judgment, in the long term.

Mr. WAMPLER. I do not offer this as an endorsement or as a commercial, but in my part of the country Sears, Roebuck and Burpee are synonymous. I, along with many of my constituents, read your catalogue or review it from cover to cover every year.

Mr. MACDOWELL. Thank you.

Mr. WAMPLER. What is the circulation of your seed catalogues?

Mr. MACDOWELL. That is a trade secret. I will say it is many millions.

Mr. WAMPLER. Let me just say that I am always fascinated by reading what new developments and what new varieties you are offering in the trade in your catalogues.

You also mentioned on page 3 that you cooperate fully with the National Seed Storage Laboratory and other agencies of the USDA, whose efforts are directed in bringing germ plasm from other areas of the world. You alluded to the fact that varieties had been brought from China. I could not help but think the soybean was originally brought to this country from China. I think it probably has been adapted to much greater use here than in the country from whence it came.

My point is this. I think that, in the whole area of research, there is a definite role for the private sector to play and also for the public sector in order to have the maximum degree of cooperation and sharing of data where that is possible.

I want to commend you. While, in terms of dollars and cents of the Federal budget, they may appear to be relatively insignificant, I think it does show a commitment on your part. I hope that you will continue to do this because it is important that we have seeds that will not only increase yields but also offer us more disease-

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resistant varieties. I am sure the only way that you do this is through research and trying to find new and better ways to do this.

I appreciate your testimony. I hope that you and others here in the private trade will continue to put forth the maximum effort possible so that we can, hopefully, in the public sector come up to what I believe should be higher commitments in trying to develop meaningful research. It is so terribly important in the environment. It is important that we have new products and new varieties and be constantly probing for new and better ways to do that.

The day that we stop doing that, I think, is the day that you are going to see American agriculture start down the hill.

Mr. MACDOWELL. Thank you for your kind and encouraging words.

Mr. Chairman, if I might just add one other brief comment, this is relative to the concern that some have that the small breeder might be negatively affected by the Plant Variety Protection Act.

I think quite the contrary. This enables a single individual with almost no resources to breed something himself or herself and protect that and offer it for sale. I would suspect that that would encourage many more people to get into a breeding function than not having that protectability.

Mr. DE LA GARZA. Thank you very much. We appreciate your being here.

Mr. MACDOWELL. Thank you.

Mr. DE LA GARZA. Our next witness is Mr. Foil McLaughlin. W will be happy to hear from you at this time.

STATEMENT OF FOIL W. McLAUGHLIN, ASSOCIATION O OFFICIAL SEED CERTIFYING AGENCIES, RALEIGH.

Mr. MCLAUGHLIN. Thank you, Mr. Chairman and Co Wampler.

My name is Foil McLaughlin. I am from Raleig director of the Association of Official Seed Ce This association is an organization made up of There are 41 members representing as man in Texas it is the Texas Department of Ag the Virginia Crop Improvement Assoc designated in each State to officially fied minimum variety purity stand

I have filed my statement wi verbatim. But I would say th 999, as explained by Mr. Le

I would, however, like amendment.

In 1970 when Cong became ar that, in This am- fied Se- Act pr- throug- at. T- ter- tec-

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certified seed. These provisions make it unlawful to sell seed not certified by an official seed certifying agency when the certificate of plant protection specifies that the seed of the variety may be sold only as a class of certified seed.

There has been concern expressed among growers of certified seed, seed control officials—both Federal and State—and the seed certifying agencies—which I represent—and the seed industry that section 501 of the Federal Seed Act should be amended to perhaps clarify its meaning. Such an amendment should make it unlawful not only to sell, as the act now provides, but to offer for sale or advertise protected varieties which involved the certification option in the seed production and marketing program.

Therefore, the Association of Official Seed Certifying Agencies offers for your consideration an amendment to H.R. 999 that would amend section 501 of the Federal Seed Act to read as follows:

It shall be unlawful in the United States or in interstate or foreign commerce to sell or offer for sale or advertise by variety name seed not certified by an official seed certifying agency when it is a variety for which a certificate of protection issued under the Plant Variety Protection Act specifies sale only as a class of certified seed: Provided, that seed from a certified lot may be labeled as to variety name when used in a mixture by, or with the approval of, the owner of the variety.

This proposal would not only apply to sales but, in addition, would extend the prohibition to seeds offered for sale or advertised. With this amendment, seed of protected varieties with the certification option would be marketed in a more orderly manner in the United States and in interstate or foreign commerce.

This amendment has been reviewed with personnel of the U.S. Department of Agriculture. It is my understanding that the Department supports the amendment mentioned above.

Mr. Chairman and Congressman Wampler, thank you for letting me express the support of our association for H.R. 999. We urge your favorable consideration and ask that you include in this bill the amendment offered for the Federal Seed Act.

Thank you very much.

Mr. DE LA GARZA. Thank you very much, Mr. McLaughlin.

After we terminate with the witnesses, we will consult with the Department witnesses in relation to your proposed amendment.

Mr. MCLAUGHLIN. Thank you.

Mr. DE LA GARZA. Our next witness is Mr. Harold Loden of the American Seed Trade Association.

Before hearing from him, without objection, we will insert Mr. McLaughlin's prepared statement.

[Prepared statement of Mr. McLaughlin follows:]

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STATEMENT BY

Foil W. McLaughlin
Association of Official Seed Certifying Agencies

before the Subcommittee on

Departmental Investigations, Oversight and Research
of the House Committee on Agriculture
July 19, 1979

Mr. Chairman, members of the Committee, my name is Foil W. McLaughlin of Raleigh, North Carolina and a Director of the Association of Official Seed Certifying Agencies. This Association is an organization of seed certifying agencies. There are 41 members representing as many states. These agencies are designated in each state to officially certify seed as meeting specified minimum variety purity standards. Seed certification, briefly defined, involves the use of seed production and conditioning standards in combination with a system of record keeping, field inspections, and seed inspections to protect the genetic purity and maintain the genetic identity of crop varieties. I should add that seed certification is a voluntary program.

I appreciate the opportunity to present to you this Association's views concerning H.R.999.

This bill would amend the Plant Variety Protection Act so that the Act would be extended to protect okra, celery, peppers, tomatoes, carrots and cucumbers which are exempted under the Act. Other proposed amendments to the Act include clarifying words and other minor changes which would make no significant regulatory impact.

The Association of Official Seed Certifying Agencies supports H.R.999. I understand that you will be considering some additional amendments to this bill so that the Act may be compatible with the international plant protection program. We support these additional amendments.

In 1970, when Congress considered and passed the bill which became the United States Plant Variety Protection Act the same bill amended the Federal Seed Act. This amendment added Title V - Sale of Uncertified Seed of Protected Varieties (Section 501) This section of the Federal Seed Act prohibits the sale of uncertified seed of varieties protected through the certification option of the Plant Variety Protection Act. This certification option in Section 83 of the Plant Variety Protection Act permits the owner of a variety who is seeking protection to elect to have his variety sold only as a class of certified seed.

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These provisions make it unlawful "to sell" seed not certified by an official seed certifying agency when the certificate of plant variety protection under the Plant Variety Protection Act specifies that seed of the variety may be sold only as a class of certified seed.

There has been concern expressed among growers of certified seed, seed control officials (Federal and State), seed certifying agencies and the seed industry that Section 501 of the Federal Seed Act should be amended. Such an amendment should make it unlawful not only to "sell" as the Act now provides, but to "offer for sale or advertise" protected varieties which involve the "certification option" in the seed production and marketing program.

Therefore, the Association of Official Seed Certifying Agencies offers for your consideration an Amendment to H.R.999 that would amend Section 501 of the Federal Seed Act (53 Stat.1275) to read as follows:

> "It shall be unlawful in the United States or in interstate or foreign commerce to sell or OFFER FOR SALE OR ADVERTISE by variety name seed not certified by an official seed certifying agency when it is a variety for which a certificate of protection issued under the Plant Variety Protection Act specifies sale only as a Class of Certified Seed: Provided, that seed from a certified lot may be labeled as to variety name when used in a mixture by, or with the approval of, the owner of the variety

The proposal would not only apply to "sales" but in addition, would extend the prohibition to seeds "offered for sale or advertised". It is the intent to make it unlawful to sell or offer for sale or advertise seed of a variety protected through the certification option (Section 83, Plant Variety Protection Act) unless the seed are certified and labelled with the variety name. With this amendment, seed of protected varieties with the certification option would be marketed in a more orderly manner in the United States or in interstate or foreign commerce.

This amendment has been reviewed with personnel of the U. S. Department of Agriculture and it is my understanding that the Department supports this amendment to the Federal Seed Act.

Mr. Chairman and members of the Committee, thank you for the opportunity to express the support of our Association for the bill, H.R.999. We urge you to give favorable consideration and ask that you include in this bill the amendment offered for the Federal Seed Act.

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STATEMENT OF HAROLD D. LODEN, EXECUTIVE VICE PRESIDENT, AMERICAN SEED TRADE ASSOCIATION

Mr. LODEN. Thank you, Mr. Chairman.

My name is Harold Loden. I am the executive vice president of the American Seed Trade Association and the National Council of Commercial Plant Breeders. Both of these organizations support the proposals and particularly the provision which would eliminate the inequity which now exists for the breeders of those six vegetable seeds which have previously been discussed.

I have a complete statement which I will not read. But I would like to state that the main purpose of my testimony is to request an additional amendment. The reason for this amendment to section 402, which is detailed in the testimony, is, first, that it will give U.S. consumers access to varieties developed in a foreign country which might not otherwise be available in the United States. The reason is that there is presently a 1-year limitation after filing in a foreign country which would prohibit the protection of that variety within this country, and, as a result, foreign breeders are reluctant to sell such varieties in the United States. Therefore, they are denied to American consumers.

This amendment would also make the Plant Variety Protection Act consistent with the treaty for the international protection of plant varieties. And the U.S. seed industry, as well as—as you have already heard—various Government departments support the U.S. adherence to this treaty.

In addition to supporting that additional amendment, we also support the inclusion of the amendment outlined previously by Mr. McLaughlin.

I would like to respond, if I may, to one point raised by Mr. Grassley and clarify some misunderstanding in the document from which he read with respect to the European experience and the confusion with respect to legal and illegal varieties.

It has been intimated that illegal and legal varieties are in some manner associated with plant variety protection. This is completely erroneous. Whether a variety is or is not protected is irrelevant and immaterial in the application of the European Common Catalog, which is a list of varieties truly approved. The purpose of it is to approve only certain varieties for production by farmers in most European countries. This is a principle which the U.S. seed industry and the U.S. Government—those people involved in the administration of our seed laws—do not accept as a basis of good legislation.

We feel our farmers are competent and intelligent enough to make a determination of what they would like to plant without its being dictated by the Government.

So, in this case, the illegal and legal varieties referred to are related to the European Common Catalog of approved varieties and in no way related to UPOV and in no way related to protection or nonprotection.

Mr. Chairman, I would also like to request that, because of some of the questions which have been raised in these hearings, that the record be kept open for the possibility of filing either amended or additional statements.

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I appreciate the opportunity of presenting this testimony and would be pleased to respond to any questions.

Mr. DE LA GARZA. Thank you very much, Mr. Loden.

Do you have any questions, Mr. Wampler?

Mr. WAMPLER. No, Mr. Chairman.

Mr. DE LA GARZA. There are no questions at this time.

I might inform you, Mr. Loden, and the other witnesses that, inasmuch as some suggested amendments have been presented to us this afternoon, it would be the intention of the Chair to continue the hearings for a subsequent time when we might consider the amendments and have a markup on the legislation. Therefore, up to that time, the record would be open for any addition from any member present or any other person wishing to submit testimony.

The next witness is Mr. Cary Fowler. Before hearing from him, without objection, your prepared statement will be inserted, Mr. Loden.

[Prepared statement of Mr. Loden follows:]

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STATEMENT OF

Harold D. Loden, Executive Vice President
American Seed Trade Association

BEFORE THE
HOUSE AGRICULTURE SUBCOMMITTEE ON
DEPARTMENT INVESTIGATIONS, OVERSIGHT, AND RESEARCH
ON H.R. 999 AND H.R. 2844
JULY 19, 1979

MR. CHAIRMAN: My name is Harold D. Loden. I am the executive vice president of the American Seed Trade Association and also executive vice president of the National Council of Plant Breeders.

The American Seed Trade Association represents nearly 600 seed companies, 65 state and regional associations and we believe the entire U.S. seed industry. The membership on the National Council of Plant Breeders is composed of 36 firms who maintain proprietary breeding programs and represent a major part of the private plant breeding conducted in the United States.

The organizations which I represent strongly support H.R. 999 and H.R. 2844 and the principle of plant variety protection because of the benefits the Plant Variety Protection Act, (P.L. 91-577) will continue to bestow American agriculture, and of most importance, upon the consumers of the products of our agricultural economy.

H.R. 999 contains a number of housekeeping provisions which would eliminate needless requirements and bring the Act into line with actual practice in the office. One major provision would correct an inequity in the existing law which denies the breeders of six vegetables the same rights as are accorded breeders of all other sexually reproduced crop varieties.

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The main purpose of my presentation is to request an additional amendment to the Plant Variety Protection Act not in H.R. 999. This amendment is proposed for two reasons. First, and of major importance, it will result in U.S. consumers having access to varieties developed in a foreign country which otherwise may not be made available in the U.S. This is a result of the fact that foreign breeders cannot comply with the one year limitation after filing for protection in a foreign country, can therefore not obtain protection under the U.S. PVP Act and will not sell their varieties in the U.S. without protection. The other reason for this amendment is to make the U.S. Plant Variety Protection Act consistent with the treaty for the International Protection of Plant Varieties, commonly designated as the UPOV Convention. The U.S. seed industry supports U.S. adherence to this treaty. The proposed amendment is as follows:

> Section 42 of the Plant Variety Protection Act (82 Stat. 1542, 7 U.S.C. 2402), is amended by deleting subsection (a) (2) thereof and adding in its place the following:
>
> "(a) (2) *The variety was offered for sale or sold by the owner or his privies, in a foreign country, for longer than four years before the effective filing date of the application therefore, or in the case of woody plants for longer than six years before that date."*

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As it now stands:

> Section 42(a)(2) of the Plant Variety Protection Act establishes a bar to the granting of plant variety protection if an application for protection of the particular variety has been filed on behalf of the same breeder in a foreign country more than one year before the effective filing date of the application in this country. This section, however, fails to take into account the circumstances where such an application is never processed, for any reason, to the point where protection has been granted. This situation is inconsistent with the underlying policy of the PVPA set forth in the preamble of the Act and would also be inconsistent with the UPOV Convention. Further, this section has never been applied in practice. Therefore, section 42(a)(2) should be amended to eliminate this unintended bar to protection and to bring the section into conformity with Article 6 of the UPOV Convention.
>
> This can be accomplished by substituting in place of the present wording of section 42(a)(2) language restricting the period of time during which the variety could have been sold in a foreign country before the application is filed in this country. Thus, the PVPA would now prevent the granting of protection to a breeder whose variety has been marketed abroad

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for more than four years (or six years in the event of woody plants) prior to filing an application in this country, and has presumably become widely distributed; a condition which is not only consistent with the UPOV Convention but is in the public interest by preventing the granting of protection to a breeder who has marketed the variety abroad for an extended period of time.

In addition to this amendment to H.R. 999 the seed industry urges the adoption of the amendment to Section 501 of the Federal Seed Act proposed by the Association of Official Seed Certifying Agencies. Section 501 of the Federal Seed Act applies to the sale of a protected variety by variety name only as a class of certified seed. The proposal would extend the prohibition to seeds "offered for sale or advertised." This amendment to the Federal Seed Act is needed for effective administration of the Act and the seed industry supports its adoption concurrent with amendments to the Plant Variety Protection Act.

Mr. Chairman, we appreciate the opportunity to present the seed industry's views on this important matter.

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STATEMENT OF CARY FOWLER, NATIONAL SHARECROPPERS FUND

Mr. FOWLER. Mr. Chairman, I am Cary Fowler of the National Sharecroppers Fund. The National Sharecroppers Fund was founded in 1937 to promote the interests and advance the causes of small farmers, tenant farmers, sharecroppers, and migrant laborers.

At this time the National Sharecroppers Fund operates the Frank Porter Graham Center, named after one of our founders, former U.S. Senator Frank Porter Graham. The Graham Center is a demonstration farm and a training center for small farmers located in southern North Carolina.

By way of introduction of myself, I would like to say that before I joined the staff of the National Sharecroppers Fund, I was a consultant to the United Nations Center on Transnational Corporations and a consultant on plant patenting legislation to the Ministry of Agriculture of the Province of Saskatchewan, Canada.

Since my written statement is rather lengthy, I would like to summarize it for you at this point.

Several years ago, I became quite concerned about plant genetic resources and began to study this subject rather intensively. I was particularly impressed by the studies which were coming out of the National Academy of Sciences. I would like to read you a couple of sentences from the summary of one of those studies. The study is entitled, "Genetic Vulnerability of Major Crops."

The National Academy of Sciences concluded that most major crops are impressively uniform genetically and impressively vulnerable. This uniformity derives from powerful economic and legislative forces.

If you read on in the report as far as page 291, you will find out that they mention the Federal plant variety protection law as being one of these legislative forces that has contributed to genetic uniformity of American crops.

After learning about this problem, I decided to look into the European experience with plant patenting laws. This seemed wise for two reasons. One is that the Europeans have had laws on their books much longer than we have, perhaps 5 or 10 years longer. And, because plant patenting is a lengthy process, it seemed wise to look at countries where the laws have been on the books for a longer period of time and thus had had a chance to prove themselves one way or the other.

I think it is also important to look at the European experience because this amendment relates directly to it. If you read the USDA's impact statement on this legislation, you will find that one of the prominent reasons that is mentioned in that statement as to why these amendments are necessary is so that we can join UPOV, an organization which is composed primarily of European nations on issues of plant patenting.

I placed a phone call to Dr. Erna Bennett of the Crop Ecology and Genetic Resources Unit of the United Nations Food and Agriculture Organization. I asked her about plant patenting laws, and I asked her about their relationship to genetic resources. She said: "Oh, yes, the link between the laws and genetic resources is quite direct. By 1991, fully three-quarters of all the vegetable varieties

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now grown in Europe will be extinct due to efforts to enforce these laws."

Then we looked into the laws a bit more closely. We found out that the problem seemed to be that the laws were very difficult to enforce—in fact, almost impossible to enforce because it is not very easy to go into a courtroom and prove that one company's vegetable is the same as another company's patented variety. Indeed, the UPOV organization itself admits that no two plants are exactly alike.

Dr. Bleasdale of the United Kingdom's National Vegetable Research Station, in a conversation, told me that, to solve some of these problems of enforcement of their laws, Europe had established a system of legal and illegal vegetables.

What I would like to do is to show you a list of vegetables which will be deleted from the Common Catalog as of June 30 next year. Deletion from the Common Catalog means that it will no longer be legal to sell seeds of these vegetable varieties. This is a quite impressive list, as you can see. It is quite lengthy. Just starting the list, there are 2½ single-spaced pages listing varieties of onions that will be deleted and no longer legal to raise seeds for in Europe in 1980.

Dr. Hutchinson of Oxford University was contacted about this legislation, about the Common Catalog, about this problem of legal and illegal vegetables and we asked for a reason why this had to be. He said, "For administrative reasons diversity will not be tolerated."

H.R. 999 proposes, in effect, to standardize our plant variety protection law to facilitate our joining UPOV—in other words, to standardize our laws with European laws.

The obvious question is—and we do not have an answer for this, but we think it is a valid concern—will this lead us to setting up a similar system of illegal vegetables 10 years down the road in order to enforce our laws, which, at least at first glance, are becoming rather similar to European laws?

Next, we looked at the seed industry in the United States. We noticed that there had been a remarkable number of takeovers in the seed industry recently. I want to read you just what a few of those are. In recent years these corporations have bought seed companies: Cargill, Celanese, Ciba-Geigy, Diamond Shamrock, FMC, ITT—which owns Burpee now—KWS—a German firm—Monsanto, Olin, Shell—Shell owns 30 seed companies in Europe—Pfizer, Purex, Rorer-Amchem, Sandoz, Union Carbide, and Upjohn.

While I am heartened and encouraged by the comments of the representatives from the USDA regarding the fact that the Plant Variety Protection Act has not contributed to these takeovers, I still must express some concern that, I think, a study probably should be done on this to determine whether or not there have in fact been these kinds of effects.

I am concerned that I have heard—and have not been able to find any studies which would examine the relationship of the Plant Variety Protection Act to these takeovers, any studies which would examine the relationship between the Plant Variety Protection Act and seed prices. There are no studies that I know of that examine

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the effect that consolidation in the seed industry will have on seed prices.

Finally, I know of no studies which would assess the effect of ownership of a good number of our seed companies by petrochemical firms, who are manufacturers of pesticides and fertilizers—the effect that this might have on seed research programs within those companies.

The question then becomes, who benefits from plant patenting legislation? We did a small study ourselves on who had gotten the patents and the number of varieties. We found, for instance, there had been 73 patents issued on beans; 79 percent of those patents are held by just four companies, all petrochemical corporations.

What importance does this have then to the Plant Variety Protection Act and to the genetic diversity issue? I think the importance is that, according to the National Academy of Sciences, there are just two varieties of dry beans which account for 60 percent of the acreage that is planted to those dry beans. There are just three varieties of snap beans that account for 76 percent of the acreage devoted to snap beans.

If I can refer back to the fact that nearly 80 percent of the patents on beans have been acquired by four companies, I think the relationship becomes interesting. It becomes interesting because of the small number of corporations that acquire the rights over varieties of beans which may account for a rather substantial portion of our acreage planted to beans.

Two companies now have 43 percent of the patents issued for peas. I could go on and on.

Another concern has been expressed about research, about how this amendment might affect research. I can only say that we contacted Dr. Glen Anderson, who is an assistant to a Nobel Prize winner down at the International Corn and Wheat Improvement Center. He said they were all very distressed by plant patenting legislation, that it had caused a great deal of harm in their own breeding program. They had found it very difficult to get the germ plasm resources that they needed simply because companies that are working on varieties that they wish to patent are not apt to want to release some of that material until the patents are actually issued.

Finally, I would like to talk about the questions of tomatoes. Tomatoes are one of the six vegetables that are included in this amendment and, if the amendment passes, would be eligible to be patented.

I want to quote to you from a book entitled, "Conservation of Germplasm Resources: An Imperative." It is a book published by the Committee on Germplasm Resources of the National Academy of Sciences. It says:

> In the case of some crops, the introduction of the new cultivors produced in crop-breeding programs for large-scale production is eliminating many of the folk varieties or land races. It is well established that the genetic diversity of such food crops as white potatoes, tomatoes, and sugarcane has been severely reduced.

In other words, what the National Academy of Sciences is saying is that the production of new varieties of tomato has contributed to a significant diminishment in germ plasm resources for tomatoes.

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The question I would then like to raise with the committee is: Do we actually need at this point then to actively encourage the production of yet more new varieties of tomatoes?

The questions that have been raised regarding the effects of these amendments on genetic resources and on consolidation in the seed industry are certainly serious enough to warrant caution. At the least, a serious inquiry into these problems should be made.

I can think of no valid reason for haste in approving amendments which might have such disastrous impact. Nine years have passed since the passage of the Plant Variety Protection Act in 1970. I do not think it will hurt us to wait a little bit longer so that we can adequately study the European experience, for instance, and the other concerns that we have raised today.

The National Sharecroppers Fund has worked hand in hand with sharecroppers and tenant farmers and with migrant laborers and small farmers since 1937. Through this work we have come to believe that we have a responsibility to future generations to safeguard their right to inherit a viable and a permanent agriculture. Passage of these amendments will threaten our legacy to future generations while doing no good for us.

For these reasons, on behalf of our constituency and the 18,000 people around the country who actively and regularly contribute to and support our work with rural people, we would like to sincerely urge you to reject the amendments. Thank you.

Mr. DE LA GARZA. Thank you very much, sir.

Without objection, your prepared statement will be inserted.

[Prepared statement of Mr. Fowler follows:]

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TESTIMONY BY CARY FOWLER

on behalf of

THE NATIONAL SHARECROPPERS FUND

before

THE HOUSE AGRICULTURE SUBCOMMITTEE

ON DEPARTMENT INVESTIGATIONS, OVERSIGHT AND RESEARCH

on HR 999: AN AMENDMENT TO THE PLANT VARIETY PROTECTION ACT

July 19, 1979

I am Cary Fowler representing the National Sharecroppers Fund. Since 1937, the National Sharecroppers Fund has worked with and tried to advance the best interests of the nation's sharecroppers, tenant farmers, migrant workers and small farmers. Since 1972, we have operated the Frank Porter Graham Center, named after a former U.S. Senator from North Carolina and beloved president of the University of North Carolina, who was one of the founders of the National Sharecroppers Fund. The Graham Center is a demonstration farm and a training center where small, low-income farmers come to learn new agricultural skills appropriate to their situation. We are located in southern North Carolina in one of the poorest counties of the state, yet we work with some of the finest people you will find anywhere.

By way of introduction, I am the director of the Resource Center at the National Sharecroppers Fund's Frank Porter Graham Center. Prior to joining the staff I was, among other things, a consultant to the United Nations' Centre on Transnational Corporations and a consultant to the Ministry of Agriculture of the Province of Saskatchewan, Canada, on the subject of plant patenting proposals in Canada.

I am pleased to be here today to offer my thoughts to you on the subject of the proposed amendments to our Plant Variety Protection Act.

I. THE CRISIS OF GENETIC UNIFORMITY

American agriculture is imported. All major food crops grown in North America originated elsewhere, in what we call the Third World. For Americans there is really no such thing as the home-grown meal. Wheat, spinach and apples, for example, are from Asia. Soybeans come from China. Corn and tomatoes originated in Central America. Potatoes are from the Andes and sorghum originated in Africa. Only hops, Jerusalem artichokes, sunflowers, a couple of berries and a few other lesser foods originated in North America.

Nearly all of our food crops are of ancient origin. Thousands of years ago our Stone Age ancestors began domesticating plants, saving the best seed for replanting the next year. Human efforts and natural selection processes resulted in different varieties of food crops becoming adapted to "different niches in the ecosystem." The result was thousands of varieties of wheat, rice, corn and other crops as genetically distinct as beagles and Great Danes. In diversity there was strength. As pests and diseases changed or mounted more powerful attacks, plants evolved different or better defenses. These defenses were represented in the genetically diverse varieties of each crop. Modern agriculture is changing this natural system.

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With the breeding and marketing of new "improved" varieties, traditional varieties are being replaced Farmers and gardeners stop growing them. Field after field is planted with one variety Where thousands of varieties of wheat once grew, only a few can now be seen. When these traditional plant varieties are lost their genetic material is lost forever. Herein lies the danger. Each variety of wheat, for example, is genetically unique. It contains genetic "material not found in other varieties If because of genetic limitations which result from inbreeding new varieties are no longer resistant to certain insects or diseases (conceivably even insects or diseases never before known to attack wheat) then real catastrophe could strike Without existing seeds which carry specific genes conferring resistance it may not be possible to breed resistnace back into wheat, corn, tomatoes, or any other crop

How serious is the situation? The concerns of the scientific community speak loud and clear

> "Genetic erosion was already well advanced in much of Europe, the United States, Canada, Japan, Australia, and New Zealand, where active plant breeding programs had been under way for some decades. The speed with which enormous crop diversity can be essentially wiped out is astonishing." (Dr. Jack Harlan, University of llinois Science)

> "These resources stand between us and catastrophic starvation on a scale we cannot imagine. In a very real sense, the future of the human race rides on these materials....A pure line mentality convinced that variation was bad, uniformity was good, and off-types in the field somehow immoral, developed. Symptoms of the mental climate could be found in crop udging contests ribbons awarded at county and state fairs crop improvement associations seed certifying agencies, and in some provisions of state and federal seed acts...The Mexican wheats have washed over Asia with astonishing speed, replacing major centers of diversity almost overnight.... In many areas it is already too late to salvage anything.... The line between abundance and disaster is becoming thinner and thinner, and the public is unaware and unconcerned. Must we wait for disaster to be real before we are heard? Will people listen only after it is too late?" (Dr. Jack Harlan, University of Illinois, Journal of Environmental Quality)

> All cereals "are in a highly precarious position." (Dr. Erna Bennett, UN Food and Agriculture Organization)

> The situation of genetic uniformity is "like a tinder-dry prairie waiting for a spark to ignite it." (Dr. J. Artie Browning, Iowa State University, before Senate Agriculture Committee)

> "...most crops are impressively uniform genetically and impressively vulnerable. This uniformity derives from powerful economic and legislative forces." (National Academy of Sciences, Genetic Vulnerability of Major Crops)

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> "The extinction of these local land forms and primitive races by the introduction of improved varieties is analogous to taking stones from the foundation to repair the roof....The wheat stem rust which took 65% of the Durum wheat crop in 1953, 75% of it in 1954, and 25% of the bread wheat in that same year, or the southern corn blight of 1970, are only early warnings of the value of genetic diversity and the liability of genetic uniformity....Up to the present time, we have been able to return to areas of genetic diversity, usually located in Third World nations, to collect germplasm for further breeding programs. Suddenly in the 1970's, we are discovering Mexican farmers planting hybrid corn from a midwestern seed firm, Tibetan farmers planting barley from a Scandinavian plant breeding station, and Turkish farmers planting wheat from the Mexican wheat program. Each of these classic areas of crop-specific genetic diversity is rapidly becoming an area of seed uniformity."
> (Dr. Garrison Wilkes, University of Massachusetts, The Bulletin of the Atomic Scientists)

The fears expressed by these respected scientists are not far-fetched. Unfortunately the predicament they describe is not unrelated to the proposals at hand. We contend, in fact, that they are directly related.

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II. PLANT PATENTING

Background

The idea of patenting new inventions is an old one. Some European nations had had patenting laws several decades before Columbus raised his sails and headed west to America. But the notion that living things could--or should-- be patentable is new and controversial. In the early 1960's, in order to protect their markets, French rose breeders pressed for laws allowing them to patent their roses. This quickly led to the first comprehensive system of plant patenting.

After encountering initial opposition from the USDA during the Johnson administration, similar laws were enacted in 1970 under the Nixon administration. However, the large soup companies (of which there are only two) objected to the inclusion of six vegetables into the so-called Plant Variety Protection Act and they were therefore specifically excluded from coverage.

The proposed amendments (HR 999 and S. 23) are designed to drop all legal barriers to patenting the six vegetables (tomatoes, carrots, celery, peppers, cucumbers and okra), standardize patent coverage with European laws by extending coverage from 17 to 18 years and thereby facilitate U.S. entry into the International Union for the Protection of New Varieties of Plants (UPOV). UPOV is a Geneva-based organization active in promoting and coordinating plant patenting laws around the world.

Enforcement of Patenting Laws

Patenting legislation is easier to pass than to enforce. It is almost impossible to prove in court that "your tomato is identical to my patented variety." Unlike new mouse traps, plants do not naturally lend themselves to patenting. No two are ever alike. Who should know this better than UPOV, which openly admitted in one of its official publications that "in reality one single plant is not exactly like any other." Moreover, according to UPOV, there is "no commonly accepted precise definition" of the term, "plant variety." Little wonder that enforcement of patents on new plant varieties has become a legal nightmare in the European nations that first instituted the laws.

Illegal Vegetables

Undaunted by the constraints of nature, European lawmakers

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have plunged ahead. Today, member nations of UPOV are busily phasing in a system of "legal" and "illegal" vegetables designed to facilitate enforcement of the plant patenting laws. A "Common Catalog" has been established listing those vegetable varieties it is permissible to grow and whose seeds may be sold. Seeds of varieties not listed cannot be legally sold. If the vegetable is one that cross-pollinates, an unlisted variety cannot even be grown by the backyard gardener whose plot lies near commercial production of that vegetable. Fines can be stiff--up to 400 pounds in the U.K.--for violating the laws.

In essence, by outlawing hundreds of vegetable varieties, genetic islands are being created around the patented varieties to reduce the confusion of ownership challenges in the courts. Furthermore, varieties that are inherently too variable to be effectively patented are taken off the list (or not allowed on) and thereby outlawed, even though such variability is often desirable from an ecological standpoint.

Sir Joseph Hutchinson of Oxford University in England sums up the European predicament:

> And this is where the plant breeders' rights legislation (also called Plant Variety Protection, Plant Varietal, and Varietal Restriction legislation--C.F.) is so damaging. For administrative reasons, diversity will not be tolerated. If a man has a right to a reward for his variety, those who have to implement his right must be able to identify what is rightly his. So they insist that his variety must be so uniform that there can be no doubt about it. If this were as far as they were to go, it would not matter greatly. But they also insist that nothing must be grown except varieties that are equally identifiable. So you must not sell for seed anything except pure and certified varieties. Thus we are compelled by law to do our utmost to eliminate all variabilities from the most valuable stocks we have.

The number of illegal vegetables rises every month as varieties are steadily deleted from the Common Catalog. In August of 1978, 126 varieties were removed. Two months earlier, 32 varieties of broad beans alone "got the chop."

Enforcement Leads to Extinction

As varieties are deleted from the Common Catalog, seed companies cease to offer them for sale. Survival then depends on the commitment of individuals to grow these varieties, save their seeds and replant them year after year. Given the situation, the liklihood of even short-term survival of Europe's vegetable heritage is slim.

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Dr. Erna Bennett of the Crop Ecology and Genetic Resources Unit of the United Nations Food and Agriculture Organization in Rome estimates that by 1991, fully three-quarters of all the vegetable varieties now grown in Europe will be extinct due to the attempt to enforce plant patenting laws. Dr. J.G. Hawkes, professor at the Unversity of Birmingham (U.K.) and president of Europe's Association of Plant Breeders, confirms this dire prediction.

At Sweden's prestigious Weibullsholm Plant Breeding Institute, Dr. Stig Blixt bemoans the fact that Europe's laws are "certainly leading to genetic wipe-out; and in my opinion, also to less adaptable and more vulnerable varieties."

And Sir Joseph Hutchinson, who terms the laws "restrictive" and "counterproductive," observes with concern that "we have in recent years, particularly in Western Europe and in North America, done serious damage to our prospects of maintaining that diversity. In the interest of economic advance we have established varietal rights legislation, and in the EEC we are engaged in making sure that none but the most advanced varieties are allowed to be sold in the area, thereby very greatly restricting the diversity that is available to us. We are in fact selling our birthright for a mess of pottage."

OXFAM, the British-based charity whose efforts are normally focused in developing countries, has recently evidenced an appreciation for the value of these traditional varieties. In an unusual move, they are giving support to efforts to preserve the endangered vegetable varieties.

Ironically, in some European nations, governments have begun to place advertisements in newspapers asking the citizenry to send them seeds of the outlawed varieties that they might be stored in seed banks. If the seeds are inferior and unworthy of being saved, if it does no harm to make their sale illegal, why go to all the trouble of collecting and saving them?

Valuable Varieties Being Lost

Some sources evidence little concern, contending that the deleted and soon-to-be extinct varieties are inferior varieties. They dispute the need to preserve these varieties. Others hotly contest such views. Lawrence Hills, Director of the United Kingdom's Henry Doubleday Research Association goes so far as to assert that some of the varieties being lost are the "Goyas and Rembrandts of the kitchen garden." In his opinion the Common Catalog scheme is nothing less than a bureacratic blight on Europe's traditional vegetable varieties.

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At the International Corn and Wheat Improvement Center, scientists are calling the laws "disastrous. Dr J.K.A. Bleasdale of the Wellesbourne National Vegetable Research Station in England describes the Common Catalog as a "self-inflicted wound Dr Bleasdale confirms the interpretation of the Common Catalog as a system of "legal" and "illegal" vegetables made necessary by the problems of proving individuality and ownership under UPOV. Asked why European scientists were not in an uproar over the prospect of losing three-quarters of their vegetable varieties within a decade, Bleasdale replied that "purely commercial interests dominate and that a sense of inevitability" prevailed. Europe might be safe for democracy, but evidently it is not safe for vegetables.

Are We Traveling the European Route?

Already there are fears that our own Plant Variety Protection Act may be leading towards decreased genetic diversity. In an article published by the New York Academy of Sciences, Dr. D.N. Duvick of Pioneer Hi-bred International observed that: "In fact, the trend appears to be toward fewer and more uniform cultivars. (The recently enacted Plant Variety Protection Act also tends to force cultivars toward phenotypic uniformity for accurate varietal description.) This may mean that breeders [or lawmakers--C.F really do not believe in the dangers of genetic vulnerability or it may mean that the pressures of the marketplace (the farmer and/or the processor) overcomes the stated wishes of the plant breeder."

The European experience with plant patenting and its enforcement bears close and serious scrutiny in the United States. Europe's laws are older that ours. They have had more time to produce results good and bad. The proposed amendments to the Plant Varieties Protection Act would standardize our laws with theirs. Are we headed towards a system of legal and illegal vegetables? Will we destroy the valuable genetic diversity of America's agriculture? Will we too drive existing varieties extinct? Is there a concrete reason to believe that our laws will not ultimately have the same disastrous results as similar laws in Europe are now having? Will Congress and the seed industry slow down long enough to ask these questions before these amendments are made law?

Plant Patenting and the Seed Industry

The express purpose of the inaccurately named Plant Variety Protection Act is to protect plant breeder s"rights." More to the point, its purpose is to protect the investment of the companies active in plant breeding and to insure their control over the marketing of new varieties. To the extent that plant patenting laws are successful they should increase the profitability of those companies large enough to engage in breeding programs. An analysis

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follows which reveals that a large percentage of patents have gone to large multinational corporations. This may partially account for the recent spurt of takeovers and mergers in the seed industry.

Petrochemical Giants Acquire Seed Companies

Old, family owned seed companies are being bought out at a rapid rate. According to the prospectus, for $25,000 L.W. Teweles & Co. will send you a copy of its report on the seed industry describing the "profound interest in the seed trade and acquisition activity by major pharmaceutical, chemical, petroleum and food companies" and the "acquirers' romance with the seed industry."

This "romance" has led to the takeovers listed below. This is not an exhaustive list. Nor does it give the 11 takeover/merger talks now underway according to L.W. Teweles & Co.

SOME RECENT NORTH AMERICAN SEED COMPANY TAKEOVERS

NEW OWNER	SEED COMPANY
Anderson Clayton	Paymaster Farms Tomco-Genetic Giant
Cargill	Dorman Seeds Kroeker Seeds PAG
Celanese	Cepril Inc. Moran Seeds
Central Soya	O's Gold Seed Co.
Ciba-Geigy	Funk Seeds Int'l. Stewart Seeds
Diamond Shamrock	Taylor-Evans Seed Co.
FMC Corp.	Seed Research Assoc.
Garden Products	Gurney Seeds
General Foods	Burpee Seeds
Hilleshoeg/Cardo	Int'l. Forest Seeds Co.
Int'l. Multifoods	Baird Inc. Lynk Bros.
I.T.T.	O. M. Scott & Sons
Kent Food Co.	L. Teweles Seed Co.
Kleinwanzieberer Swatzucht AG	Coker's Pedigreed Seed Co.
Monsanto	Farmers' Hybrid Co.
NAPB (Olin & Royal Dutch Shell)	Agripro, Inc.
Pioneer Hi-bred	Lankhart Lockett Arnold Thomas Seed Co.
Pfizer	Clemens Seed Farms Jordan Wholesale Co. Trojan Seed Co. Warwick Seeds
Purex	Advanced Seeds Ferry-Morse Seeds Hulting Hybrids
Rorer-Amchem	Jacques Seed Co.
Sandoz	National-NK Northrup-King Rogers Brothers
Southwide, Inc.	Delta & Pine Land
Tate & Lyle	Berger & Plate
Tejon Ranch Co.	Waterman-Loomis Co.
Union Carbide	Keystone Seed Co.
Upjohn	Asgrow Seeds Associated Seeds

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Effects Unknown

The rapid consolidation in the seed industry has largely gone unnoticed and unstudied with the exception of exhorbitantly priced studies written for the industry itself. We are unaware of any government or private studies which:

1. Examine the relationship between the Plant Variety Protection Act and seed company takeovers.

2. Examine the present and future effects of the Plant Variety Protection Act on seed prices.

3. Examine the effect of industry consolidation on present and future seed prices.

It would appear prudent to us that the government undertake such studies before making a determination on the proposed amendments.

We at the National Sharecroppers Fund are fearful that recent seed industry trends spell higher seed prices to American farmers. Patents give their holders a virtual monopoly. The better and more useful the patented variety, the more able the holding company is to force up market prices artificially.

We at the National Sharecroppers Fund are also concerned that patenting laws will give large seed companies an advantage in the marketplace which might threaten the very existance of smaller companies unable to market the new, highly-advertised, patented varieties. The owners of several small seed companies have expressed such fears to us.

And we are quite concerned over the implications of seed company takeovers by the petrochemical industry--the manufacturers of pesticides and fertilizers. Dr. Richard Lewontin of Harvard University , states "there is legitimate reason to suspect that chemical companies will link chemical research to plant varieties they are developing." According to the U.N.'s Food and Agriculture Organization, the marketing of seeds and agricultural chemicals are often handled through the same channels. And the seed industry is probably "the best catalyst" for expanding these markets in developing countries. To the enterprising chemical company, the development and marketing of seeds and agricultural chemicals could have intriguing possibilities.

Teweles & Co. calls attention, for example, to the potential for "seed coating and pelleting, utilizing the seed as a delivery system for chemicals and biologicals to the field." Upjohn, Union Carbide, Monsanto, Diamond Shamrock, ITT and Sandoz-- all seed

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company owners--are all working in this area.

At FMC, the link between its agricultural chemicals and seeds operations is clear. In the corporate structure, the seed business falls under the management of the Agricultural Chemical Group. The Seed Department manager is a former Agricultural Chemical Group planner. Are such practices creating a bias towards development of new varieties that are more needful of agricultural inputs? Do such relationships foster assumptions on the part of plant breeders of the continued availability of such chemicals and the advisability of their use?

Again we must note that we know of no study which has examined the effect ownership of seed companies by petrochemical firms might have on the operations and programs of those seed company subsidiaries. We think such a study is warranted.

It would seem that the option of patenting makes advertising seed varieties more attractive. Is this beneficial to the farmer? Who ultimately pays for the advertising? Will seed company ads be better monitored than the drug ads of their parent companies?

Finally, we are concerned with the effect that patenting might have in developing countries. In 1960 a Royal Commission in Canada rejected the notion of plant patenting, fearing that Canadians would just end up paying royalties to U.S. corporations--95% of Canadian patents are granted to foreigners. Are developing countries better able to pay such fees? Already stories are circulating around CIMMYT of unethical marketing practices of multinational corporations in pushing inappropriate seed varieties in Africa. As one scientist put it, the seeds were "best known for being best known."

Genetic Wipe-out

But an even more important question concerns the effect that increased marketing of new, patented varieties might have on the survival of traditional varieties in areas of great, natural genetic diversity. Such diversity in what are commonly called "gene centers" is invaluable and irreplaceable. There is wide agreement among experts that new varieties have played a major role in replacing traditional varieties in these areas. When new varieties replace old varieties, according to Dr. Garrison Wilkes of the University of Massachusetts, "quite literally, the genetic heritage of a millennium in a particular valley can disappear in a single bowl of porridge."

Will the United States entry into UPOV encourage or facilitate further marketing of new varieties in the "gene centers?" What effects will this have on crop genetic resources? Are multinational corporations taking responsibility for the traditional varieties

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their new models displace? Are they seeing that these traditional varieties are collected and stored? Is the U.S. government willing to take responsibility for seeing that this is done? (The present budget for plant collection is approximately $35,000.) Is the United States government willing to take the responsibility for it not being done?

Final Considerations and Conclusions

Our knowledge is too skimpy and our understanding of the complex relationships in our environment too limited for us to fully appreciate what the loss of crop genetic material will mean to us and future generations But it is clear that we are losing that genetic diversity at an astonishing rate And it is certain that this diversity is in the words of the National Academy of Sciences, "essential to meet long-term human needs "

Genetic diversity as the foundation of agriculture, must be preserved if we are to preserve agriculture itself. Given the alarming loss of this diversity in recent years "it is in the best interest of human society." according to the National Academy of Sciences, "to see that the diversity of natural ecosystems does not appreciably diminish."

But while concern grows, so does the problem and our contribution to it. Food and Agriculture Organization experts fear the complete loss of the Near East gene center (center of genetic diversity for wheat and other important crops) by the end of the 1980's. And officials at the National Seed Storage Laboratory at Fort Collins, Colorado, cite the need for "crash programs" of collection and storage of the vanishing varieties

Passage of HR 999 and S. 23 would exacerbate these problems. Passage would be particularly detrimental in the case of tomatoes. Nutritionally, tomatoes are perhaps the most important "vegetable" in the North American diet. They are a major source of vitamin C in our diets. But according to British scientist, Michael Allaby, virtually "all varieties are highly inbred populations with no significant genetic deversity within a variety

In Conservation of Germplasm Resources: An Imperative, published by the Committee on Germplasm Resources of the National Academy of Sciences, the Academy stated:

> "In the case of some crops (e.g. wheat, Triticum), the introduction of the new cultivars produced in crop-breeding programs for large-scale production is eliminating many of the folk varieties or land races. It is well established that the genetic diversity of such food crops as white potatoes (Solanum), tomatoes Lycopersicon), and sugar cane (Saccharum) has been severely reduced." (our emphasis)

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We are told that perhaps the most important benefit of the Plant Variety Protection Act is that it encourages companies to develop new varieties Yet if the National Academy of Sciences is correct in saying that new varieties of tomatoes have "severely reduced" tomato genetic diversity, do we really need a law which will encourage the development of more new varieties? We think not. In order not to further deplete genetic diversity in tomatoes, we strongly urge that tomatoes be omitted from HR 999 and S 23 Allowing genetic uniformity in our major food crops is one thing wantonly destroying diversity is another. The later is intolerable.

This diversity cannot be ensured by placing seeds of the endangered varieties in seed banks. The National Academy of Sciences advises that After weighing all available measures for preserving endangered species under controlled conditions we are repeatedly forced to the conclusion that the only reliable method is in the natural habitat This being the case, we contend that the European Common Catalog and ultimately our own Plant Variety Protection Act, will have serious negative repercusions on genetic resources by discouraging the use (and existence) of traditional folk varieties. Both the Common Catalog in Europe and the Plant Variety Protection Act in the U.S. will encourage the replacement of these varieties by new patented varieties.

What is called for is a greater commitment to conservation of genetic resources--to conservation by means of expanded seed collection and storage projects and to conservation by means of ensuring the survival and continued use of traditional varieties by farmers and gardeners and ensuring the survival of small seed companies that supply these seeds.

But we also desperately need a healthy dose of caution as we evaluate proposals to extend coverage of the Plant Varieties Protection Act. Nothing will be gained by ignoring the numerous ramifications of this amendment

The United Nations designated the year, 1961, as "International Seed Year. The USDA S Agricultural Yearbook that year was devoted to seeds One of the articles noted that "A trend towards bigness is noticeable among seedhouses, although nowhere are there the giant corporations of heavy industry." Since 1961 the giant corporations have moved in. Many seed companies have been taken over by huge petrochemical firms, raising interesting questions about the direction of future seed research. We suspect that our plant patenting laws have contributed to the lessening of competition in the seed industry by making seed companies more attractive targets for acquisition.

Who benefits from patenting? Very few. A study by Hope Shand of the Graham Center in North Carolina, found that of the 73 patents issued for beans (as of March 1979), 79% are held by just four

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companies: Sandoz, Union Carbide, Upjohn and Purex. Sandoz and Upjohn hold 43% of the patents issued for peas. Two-thirds of the patents on lettuce are held by Upjohn, Union Carbide, FMC, Purex, ITT and Celanese. Nearly a third of the patents on wheat are held by five corporations. Eight corporations hold 42% of the patents issued for soybeans. Four corporations hold 44% of the patents issued for cotton.

Meanwhile, the lucrative market for patented seeds has created something of a black market in seeds. According to a consultant with the Mexican government, one major U.S. grain company obtained certified seed from the Mexican government and proceeded to patent it in Europe. And according to Dr. Glen Anderson of CIMMYT, companies are trying to patent varieties developed by CIMMYT from research that is currently free for all to use.

We suspect--and officials working with Nobel Prize winner, Dr. Norman Borlaug at CIMMYT confirm--that patenting laws have discouraged the free flow of germplasm material for research purposes. Dr. Anderson of CIMMYT has "very strong reservations" about seed patenting, and confirms that "Borlaug and all of us share this view."

By ensuring monopoly-like market conditions for big corporations holding patents and by possibly relegating the small seed companies to the markets for non-patented varieties, the Plant Variety Protection Act may eventually do serious damage to small seed companies. It could be a law that finally forces them out of business.

All of these factors will contribute to higher costs and more limited choices of varieties for the farmer and home gardener. As many of the older varieties also have special qualities (taste, nutrition, etc.), there will be social costs involved as well.

Proponents of the Plant Variety Protection Act and amendments HR 999 and S. 23 offer two major reasons for their position. First, they claim that plant breeders have a "right" to patent their new inventions. But let us not forget that literally hundreds of generations of our ancestors domesticated and developed our food crops over thousands of years. Does a plant breeder coming along in 1979, making a few changes here and there, really deserve the "rights" to the new variety as if it were his/her own? What kind of "rights" are we willing to afford the people of developing countries who are maintaining and safeguarding the genetic material of every major food crop in the world--genetic material used by our plant breeders to develop new varieties? Do they have rights? Or do they deserve only to pay patent royalties to the corporations who develop the latest varieties? Finally, do the rights of plant breeders supersede the "rights" of the public to a competitive

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seed industry devoid of conflicts of interest with the agricultural chemical industry? Do the rights of plant breeders supersede the right of the public to have the genetic wealth of our agriculture safeguarded and the future of agriculture secured?

The second major reason proponants of the amendments cite for support is the claim that the amendments will encourage the development of new varieties. Our response is three-fold. First, we are unaware of any evidence that would support this claim. Second, in the case of tomatoes and some other crops, the introduction of new varieties has caused the genetic resource base of those crops to diminish therefore we do not see a need to further encourage the development of more new varieties And third if such encouragement is needed, it can be accomplished by increased funding of government breeding programs at land grant institutions This would eliminate the numerous side-effects of plant patenting legislation.

Before we get carried away with the overwhelming necessity of possibly encouraging the development of new varieties through restrictive patenting legislation, let us hear what the National Academy of Sciences has to say about the 450 to 500 new cultivars that are offered each year. According to the Academy, "Most represent minor genetic advances and 'fine-tuned' adjustment to changes in production, harvesting, processing, and marketing procedures." This is what all of the hoop-la and talk of "rights" is over.

In short, the arguments for expanding coverage of our Plant Variety Protection Act are few in number and are unconvincing They smack of blatant economic self-interest on the part of some segments of the seed industry The questions that have been raised regarding the effects of these amendments on genetic resources and on consolidation in the seed industry are certainly serious enough to warrant caution At the least a serious inquiry into these problems should be made. There can be no valid reason for haste in approving amendments which might have such disastrous impact. Nine years have passed since passage of the Plant Variety Protection Act in 1970. It will not hurt to wait a little longer so that we can adequately study these amendments and their implications.

The National Sharecroppers Fund has worked hand in hand with sharecroppers, tenant farmers, migrant laborers and small farmers since 1937. Through this work we have come to believe that we have a responsibility to future generations to safeguard their right to inherit a viable and permanent agriculture. Passage of these amendments will threaten our legacy to future generations while doing no good for us. For these reasons, on behalf of our constituency and the 18,000 people around the country who regularly contribute to and support our work with rural people, we must sincerely urge you to reject the proposed amendments.

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Mr. DE LA GARZA. Mr. Wampler?

Mr. WAMPLER. Thank you, Mr. Chairman.

Mr. Fowler, we appreciate your coming and sharing with us your statement. I regret that I had not had the opportunity to read it before the hearing today, but I will.

Maybe there is a difference of philosophical approach to this. Do you believe that a person who develops a new plant variety should have the legal right to get a patent on that?

Mr. FOWLER. I think that we have to examine the rights of other people involved in this issue.

Mr. WAMPLER. Do you perceive of a patent as a property right under our Constitution?

Mr. FOWLER. Of course.

Mr. WAMPLER. If I understood the thrust of your testimony, it was that you did not believe that we should allow developers of new varieties the right to patent it for exclusive use for a period of time.

Mr. FOWLER. That is true. I think there is considerable room for debate as to whether or not, one, plants can be effectively patented or whether they ought to be patented, given the social impact of that patent.

Mr. WAMPLER. I can appreciate the difficulty sometimes in the process of patenting something because of the similar characteristics of a particular thing.

Also, you cited some significant data here of recent mergers or acquisitions by large corporations, many of whom, I am sure, are multinational. Are you suggesting here that they are guilty of price fixing or any illegal restraint of trade?

Mr. FOWLER. No; I am only suggesting that we, the National Sharecroppers Fund, do not have the resources adequate to look at such questions. It might simply be a good idea to investigate these types of issues.

Mr. WAMPLER. Of course, under existing law, the Federal Trade Commission, the U.S. Department of Justice, and other agencies are charged with that responsibility of monitoring these types of acquisitions to be sure that they are not illegal. Sometimes bigness in and of itself is not all bad.

Perhaps you heard the question that I propounded of Mr. MacDowell with the Burpee Co., about what percentage of their annual budget they earmark for research. From a strict business point of view, it would seem to me that a board of directors or, if it is publicly held, stockholders have every right to expect a reasonable return by way of profit on their investments.

It also would seem to me that, unless management can show some reasonable profit motive for investing large amounts of the company's money into areas like research, we are not going to have the research; and therefore we are not going to have the advantage of that research. Would you disagree with that?

Mr. FOWLER. That is a lot to comment on one way or the other.

I would say that I think we also need more studies—not just on wheat—to show whether or not the Plant Variety Protection Act has indeed spurred development of new varieties. I am not aware of those studies.

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Mr. WAMPLER. Dr. Fortmann, who testified earlier—and I think he is generally conceded as being one of the foremost authorities in this country in the field of agronomy and I think is perceived by many as being an international authority—is a part of a group, as he stated in his testimony, that has been studying this problem for a period of years.

They have been engaged in a meaningful dialog. Certainly, they, supposedly, represent the public sector. I think they are concerned as a part of the Federal-State partnership in our land-grant universities of trying to do what is best for American agriculture. I do not think they have any particular bias one way or the other, other than perhaps their obvious feeling for the land-grant system.

I think a great deal of thought and study has gone into this. This is why I was concerned about your statement.

I certainly would agree with you—and you are to be commended for what you and your group have done in trying to help impoverished people, small farmers, sharecroppers, and the like.

Maybe this subcommittee ought to give some thought as to how we can assist those groups in making those varieties available to them. It was not too many years ago—certainly within my lifetime—that the Department of Agriculture made available to Members of Congress seeds that they could mail out to their constituents. It has been suggested that we might want to rekindle that program rather than sending out so much printed material that people may or may not read. We might be better advised to say that we have seeds available for them and encourage them to plant them.

I say this in a very serious vein. I think there are a lot of things that we can do to help low-income people to produce and grow their own crops, particularly vegetables that can be grown in gardens to help feed themselves.

The gentleman from New York, Mr. Richmond, and others have been interested in this for many years. I think it is something that we might well take a look at.

I think probably you and I have a little bit of philosophical difference here on whether or not a patent is a property right and whether or not a person can effectively patent a variety without infringing on the rights of others.

Mr. FOWLER. I think that the real question involves whether we ought to extend the type of patenting right to cover plants.

Mr. WAMPLER. I thank you for your response.

Mr. DE LA GARZA. Mr. Fithian?

Mr. FITHIAN. Thank you, Mr. Chairman.

I want to say that I think it is kind of a foregone conclusion that, if you are going to get investment in development, then you have to give a reasonable opportunity for retrieving that investment. We have done this, of course, with FIFRA and many other areas. I think that is generally accepted.

I suspect that Mr. Fowler is philosophically trying to make the case that we ought to limit, so as not to use the patent rights as a monopoly and therefore continue to gain profit over and above what is required for research and development. Do I read you correctly?

Mr. FOWLER. That is partially the case.

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The other point I would like to make——

Mr. FITHIAN. Would you oppose any protection of any number of years for the seed developer who develops a new strain?

Mr. FOWLER. That is hard to comment on, not——

Mr. FITHIAN. The bill provides for 18 years protection on the patent rights, if I read it correctly. I wanted to know whether you are opposed to 18 years or you are opposed to the concept altogether of giving protection to the sole possession of that strain or variety that is developed?

Mr. FOWLER. I would be opposed to plant patenting laws in principle.

Mr. FITHIAN. I think that is what Mr. Wampler was getting at, and that is what I was trying to get at. I do not know about the equity of 18 years. I do not have any data that says it ought to be 18 instead of 7 or whatever the normal patent rights are, which I think to be considerably less than 18 years.

Mr. FOWLER. One of the reasons that I think that plant patenting legislation is so problematic is that in a sense we are trying to squeeze plants into our own legal framework. A number of scientists testified back in 1970. A number of scientists are concerned about this question in Europe. The concern is whether or not plants can be patented in any kind of efficient or scientific manner.

I think that, while patent laws themselves might be quite admirable in virtually every other case, we have a different case when we come to trying to patent nature and patent life forms; and there are problems encountered when one tries to do that.

Mr. FITHIAN. Thank you, Mr. Chairman.

Mr. DE LA GARZA. I was just thinking about your statement, Mr. Fowler. I think possibly the reason for that is that that has become a business.

Mr. FOWLER. That might be.

Mr. DE LA GARZA. We thank you very much for your participation and your testimony here. Certainly, it will be very helpful to us as we proceed with this legislation. Thank you very much.

Mr. FOWLER. Thank you.

Mr. DE LA GARZA. Our next witness is Mr. Gary Paul Nabhan.

STATEMENT OF GARY PAUL NABHAN, AGRICULTURAL BOTANIST

Mr. NABHAN. Mr. Chairman, my name is Gary Paul Nabhan. I am an agricultural botanist.

First of all, sir, I would like to request that my written statement be deleted from the record and this shorter, summarized statement be placed in instead, if that is possible.

Mr. DE LA GARZA. You would like to submit a revised statement and not have this one appear on the record?

Mr. NABHAN. Yes, because of some of the clarifications that the USDA people presented in previous testimony.

Mr. DE LA GARZA. Let me see if I understand you. You do not want your prepared statement in the record.

Mr. NABHAN. Exactly.

Mr. DE LA GARZA. Rather, you want in the record what you speak here today. Is that correct?

Mr. NABHAN. Yes, sir.

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Mr. DE LA GARZA. All right, then we will withhold your prepared statement and allow you to make your presentation here.

Mr. NABHAN. Thank you, Mr. Chairman.

Let me first say that I am not representing any institution or special interest group. I have come here out of personal funds and personal interest. In a sense, I am representing some threatened plant varieties rather than any human interest group.

Through the University of Arizona and the Arizona Desert Museum, I have collected and conserved endangered traditional crop varieties adapted to arid lands for programs of the U.S.D.A., Indian reservations, the Center for International Tropical Agriculture, the U.S. National Academy of Sciences, and for small seed companies. I consider such work to be crucial for the protection, in a very real sense, of gene pools of many crops which have been adversely affected by the spread of modern mechanized agriculture. Yet, they are vital potential resources for future agriculture.

Primarily, I see restrictive legislation such as the 1970 act and the proposed H.R. 999 amendment as putting into private control resources which have always developed and should continue to develop as part of the public domain.

Such legislation gives credence to breeders who can manipulate one or two genes of a traditional land race that evolved over thousands of years and then claim that something novel has been created from this much larger public gene pool.

Privately employed plant breeders can even cross two varieties derived from many years of genetic research done by the USDA or universities and then patent a hybrid as their own creation. Economically speaking, to let a private company for 18 years manage the distribution of genetic materials which were developed largely by others is to inequitably favor such opportunistic businesses.

It can also be argued that the 1970 act and this proposed amendment are in a sense nightmares to enforce since it is so difficult to technically define and verify what plant varieties are. I do not believe the situation with plant variety identification and variation is as simple as something that a computer printout with a few standardized categories can manage.

In their 1971 Taxon article, Drs. J. R. Harlan and J. M. J. de Wet from the University of Illinois illustrate that the term plant variety as a subspecific taxonomic unit has been so poorly defined and abused so many times that it has become inoperable for scientists.

One method which has been used to get around this problem is to use a standard empirical plant variety identification process called electrophoresis, known in the vernacular as plant fingerprinting. This is a way of identifying seeds by looking at certain banding patterns that their seed proteins provide after certain chemical treatment.

According to one electrophoresis expert, this technique is becoming increasingly utilized in the United States and in Europe and is in some ways useful, yet at other times is problematic and costly. It simply does not work for all the crops species that we are presently utilizing in this country, nor is it applicable to all of them. One electrophoresis expert gave a potential client a $5,000 estimate of cost to properly identify the material and to rule out alternatives.

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Obviously, if a small seed company must pay $500 to file an application, $250 for certification of protection, then up to $5,000 if one of their varieties is contested, plus legal and operational costs, then the entire process becomes too expensive for small seed companies to be involved in when they are producing a large number of varieties.

There are also empirical limitations to what protein or enzyme analysis can quantify. In other words, significant genetic differences in the taste or hardiness of two plant varieties might not be discernible via these methods at all.

I am opposed to any strengthening amendment of the 1970 act because it is obvious that since its enforcement more negative effects have occurred than benefits.

While Senator Frank Church and others suggest that the 1970 act has given plant breeders incentives for producing new varieties, there is little evidence that the act has served to increase the number of new varieties recognized and made available per year. To the contrary, my analysis of the official annual list of vegetable variety releases reported by the American Society of Hort Science magazines from 1967 to 1973 indicates that the total number of newly recognized varieties attained a high point in 1968, which it did not reach again in the first years after the Plant Variety Protection Act went into effect.

I believe that part of the reason for this apparent decrease in new varieties released since 1970 is that regional seed companies have been consolidated and bought up by multinational corporations that are not interested in diversity.

I think that this would be a very important topic for the committee to consider encouraging studies on.

Second, the 1970 act has in ways encouraged a blackout in regard to scientific information on plant breeding projects. Since 1972, not a single private agribusiness breeder has published descriptions of breeding schemes or techniques for their new varieties in the magazine HortScience's "Cultivar and Germplasm Releases" section, the most popular outlet for such information among university and government breeders. Once there was free exchange of such data through the magazine between the private and the public sector. I feel that the advancement of science and the flow of useful information on genetic resources are suffering due to the profit motive.

I am opposed to the proposed amendment, particularly because of the inclusion of chili peppers. Chili peppers evolved over 5,000 years in the New World. Over that 5,000 years, none of the farmers or primitive plant breeders needed any kind of plant variety protection act to breed and select new varieties.

Small chili farms and seed companies are important in the Southwest, where both Congressman de la Garza and I are from. So, let me give a hypothetical example of the potential impact of this bill on the chili industry, using an example of the Congressman's own area.

Near McAllen, Tex., there are many family-owned chili farms, all potentially affected by the proposed restrictions. Several years ago, according to John Wiesehan of McAllen, a selection of open-pollinated cayenne chili peppers from Louisiana was introduced

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into the Rio Grande Valley. Through mass selection of this Louisiana variety, a few farmers on small Texas farms have adapted this cayenne to their area and improved it, I believe, without hybridization to be a larger, redder, hotter, and more straight-tailed pepper much more useful in the chili powder and paste production industry. The Rio Grande Valley cayenne may not be different from the Louisiana cayenne in the banding shown by this plant fingerprinting method nor in the computer printouts that the USDA have. But it is a valid ecotype for locally adapted variety.

Yet, if there had been a patent on that original introduced Louisiana selection, the farmers in Congressman de la Garza's valley may not have been able to slowly develop this superior and distinctively different chili. I request that the subcommittee consider dropping chilis from the list of added varieties.

Finally, I feel there is a serious misemphasis in government concern for plant varieties. Rather than attempting to economically stimulate the proliferation of new and largely superficial pseudovarieties, we should have as our priority the conservation of ancient but now endangered traditional crop varieties. These basic genetic resources are going extinct faster than we are collecting them and preserving them. The U.S. National Academy of Sciences' study shows this.

The USDA budget for field exploration of rare traditional crop varieties is minuscule compared to the cost of paperwork for enforcing the 1970 act.

In recent years less than $100,000 per year has been allotted to the plant explorations aspect of the USDA for germ plasm collection. Once a botanist turns into the USDA some rare seed stocks, it may be 3 years before this seed enters the U.S. National Seed Storage Laboratory.

As the system presently works, much genetic diversity is lost from these samples between the time they are collected in the field and the time they are entered into the seed banks. Documentation and distribution of incoming variety collections is seriously backlogged at USDA, Beltsville. This is not to criticize the USDA staff at all, which is highly dedicated and efficient, given their constraints. I believe many people over there are aware of that genetic conservation problem and are doing their best to deal with it.

Basic germ plasm conservation is critically underfunded and understaffed in this country. It is an essential job that has taken second place to more superficial concerns like incentives for these pseudovarieties, varieties that are very little different from one another.

I suggest that Congress consider full-scale hearings on ways to upgrade our national commitment to the conservation of basic crop germ plasm, the key resource that stands between us and hunger.

Thank you, sir. I would be happy to entertain any questions.

Mr. DE LA GARZA. Thank you very much, Mr. Nabhan.

Mr. Wampler?

Mr. WAMPLER. Thank you, Mr. Chairman.

I want to thank you for your very comprehensive statement and the concerns that you have raised here. I assure you, speaking for myself—and I am sure that I speak for my colleagues—that we will give them very serious thought.

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I certainly share your concern and view. When we look at the total research budget of the Department of Agriculture, there are many areas that are being neglected and ignored. It is not with the approval of every member of this committee. We have tried, as we are battling for the assessment of priorities, to get more basic research into the USDA. We also try through our normal funding channels and through the cooperative arrangements with our land-grant colleges and universities. Also, part of the 1977 farm bill—what became title XIV—was to go into competitive grants to permit those that normally were bypassed in the traditional formula funding to work in areas like conservation of basic crop germ plasm.

I wish I could offer you some immediate hope that it is going to be brighter. But I can assure you that we will continue to the extent that we can to get more resources devoted to this because there are so many intriguing areas in research.

I am sure that you as a scientist are far more aware of this than I am, but we are where we are today because of research; it did not just happen. I think also you would agree with me that research is not something you turn on and off as you would a water faucet. It is something you have to make a continuing commitment to.

I was intrigued by the work that you are doing in the arid and semiarid areas of the Southwest. The day may come—it may be sooner than later—when we are going to have to utilize every possible resource that we have in order to feed ourselves and help feed others.

I want to encourage you to continue this work. I want you to know that there are some of us who are appreciative of what you and others are doing in this very important field.

Again I thank you for the concerns that you have raised. We will carefully look at them.

Mr. NABHAN. Thank you, sir.

Mr. DE LA GARZA. Have you done any work with guayule?

Mr. NABHAN. Yes, sir. I have written some articles about it. I attended the guayule conferences. I am a proponent of guayule, and I am very appreciative of Congress' effort in trying to get behind this arid land crop.

Let me mention that it would be helpful if some of the money set aside for guayule went immediately into the large-scale exploration and conservation of the native guayule stands in the U.S.-Mexico borderlands.

There were more than 96 species of plants cultivated in prehistoric Mexico. To this date, we only have 26 of those in our National Seed Storage Laboratory; 26 species and hundreds of varieties, local populations with different degrees of drought resistance, productivity, and chemical content. So, even though we can be appreciative of effort that the National Seed Storage Laboratory has made so far in conserving crop varieties, we are not even halfway there in collecting the most basic resources that people have utilized in the New World for thousands of years.

And guayule is one of those plants. It has been utilized for thousands of years. It was utilized prehistorically. We have yet to make a good germ plasm collection of that.

Mr. DE LA GARZA. De you do any work on jojoba?

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Mr. NABHAN. Again, to some extent, I have written about jojoba. I have done some research on the American Indian use of jojoba, trying to point out other uses for this crop.

Mr. DE LA GARZA. Thank you very much.

You mentioned the chili operation down in my area. That was done in cooperation with Texas A. & M. University at the experiment station in Weslaco and also at the station at Texas A. & M.

Mr. NABHAN. The Weslaco plant breeders are very aware of how important the traditional crop varieties, wild relative crops are in breeding new varieties. In fact, they are using wild chili peppers to increase disease resistance in our commercial varieties.

Mr. DE LA GARZA. Regarding part of your testimony, I think I might be an expert witness in reverse. Some of the chilis grow hotter in my area. I started a chili patch up here. For some reason, they do not come out as hot. They are probably out of their environment or out of the temperate zone. Regardless of what the seed was, they just do not come out hot up here.

Mr. NABHAN. That is one other problem with trying to identify and verify what a plant variety is. It can change to some extent depending where you grow it. The stability that the USDA people reported on, that is a requirement for anyone to receive a patent, is very difficult to achieve with chili peppers because it immediately adapts so well to a local environment.

For this reason, I think that the Plant Variety Protection Act might be largely inoperable for chilis. That is why I requested that it be dropped from the list to be added to the 1970 restrictions.

Thank you.

Mr. DE LA GARZA. Thank you very much.

Did you have a further comment, Mr. Fithian?

Mr. FITHIAN. I have just one observation. It is probably nature's way to try to save your stomach lining, Mr. Chairman. [Laughter.] I appreciate the clarity of the testimony and obviously the quality that went with it. I appreciate the witness attending our meeting today.

Mr. DE LA GARZA. Mr. Grassley?

Mr. GRASSLEY. On page 4, your last sentence reads:

> I believe part of the reason for the apparent decrease in new varieties released since 1970 is that regional seed companies have been consolidated and bought up by multinational corporations that are not interested in diversity.

I do not question your legitimacy for believing that or saying it. But has there been any research done on it by anybody who might be considered an authority in the area, other than you, who has commented likewise?

Mr. NABHAN. I do not say that with much authority. I am saying that this is an issue that should be investigated.

In several of the cases where multinational corporations have bought up seed companies, they have bought up seed companies that serve particular regions, very localized regions of one or two States. Now they have one breeding program that is attempting to serve not only many States but many countries. You get a more generalized plant, a plant that is not as well adapted to a particular local environment. So, in the sense of drought tolerance, to sell a variety to many countries you may not be emphasizing drought

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tolerance as much as if you were just breeding for the conditions in west Texas.

So, it would appear to me to be a logical conclusion of that kind of consolidation of regional seed companies that we are not breeding for local adaptation so much as adaptability or a generalized plant. We lose some variation in attempting to do that when we try to get one thing that grows well everywhere.

I think this would be a good topic for further inquiry. Thank you.

Mr. DE LA GARZA. Thank you very much. We appreciate your testimony.

Our next witness is Mr. Dan McCurry of the Consumers Federation of America.

Your full statement will appear in the record, without objection.

STATEMENT OF DAN McCURRY, DIRECTOR, CONSUMERS FEDERATION OF AMERICA

Mr. McCURRY. Thank you, Mr. Chairman.

In appreciation of the late hour and the patience of the subcommittee, I certainly will summarize my statement.

Chairman de la Garza, Mr. Grassley, Mr. Wampler, and Mr. Fithian, I am Dan McCurry, a director of Consumers Federation of America, the Nation's largest consumer organization, and organizer of the Consumers Coalition of Chicago, where I make my home.

I first became aware of the problems of genetic diversity when I lived on a farm in North Carolina. I prided myself on raising blue ribbon corn. Along came the year 1970 and I raised blue ribbon black corn because it was the year the southern corn blight hit us. I remember very well crying as I saw that corn which I had hoped to win the prize in the fair being torn up by what I wasn't sure.

It was a feeling of helplessness there that instilled in me a need to go out and find out what was happening to crops, first of all my own precious little corn and then to the crops of the Nation as relates to genetic diversity and then as I came to understand the issue of the direct connection between the drainage of our gene pools and the plant patenting taking place in this country and in Europe.

I would like to touch briefly on four points. One is that I have heard so far no one denying the fact that the situation in Europe of so-called illegal varieties is one which causes great concern. Neither have I heard any denying of the disastrous situation that the world faces as the gene pool from which we can draw protection for our plant production goes downhill faster and faster each year.

I think the connection between the two in my mind is very clear when you look, sir, at what large multinational firms are now buying into the seed industry in this country. We find that European firms are buying up U.S. seed firms with an eye to the same high profits to which they have become accustomed in Europe under the plant patenting system there.

Sir, since the passage of our Plant Variety Protection Act in 1970, we have seen some of our largest seed firms go to European ownership. They are firms such as Funk Seeds, now Ciba-Geigy of Switzerland. Agripo is now Royal Dutch Shell. Jacques Seeds is now Rorer-Amchem. And the list goes on and on.

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Mr. Chairman, only last year this Congress saw the danger of foreign corporations buying up the wealth of our farmland. Most of you were active in that effort. The Congress moved to demand a regular listing of such firms and their holdings. Many States—perhaps your own—passed even stronger laws against foreign ownership of farmland. But the land, Mr. Chairman, is barren without the seed to make it productive.

In terms of the ownership of our seed companies, we do not know at the present time, gentlemen, where the true ownership lies. That ownership is not listed in any document of public record to my knowledge, and I have searched.

So, the public and the Congress have yet to become aware that recently Sandoz, a large Swiss petrochemical firm, purchased the major farm seed firm, Northrup-King. We discovered this purchase last year because it was listed with the Commerce Department as the largest single foreign investment in the United States. We had that information available to us because of Congress concern about, essentially, Arab investment in the United States—petrodollars. We demanded a listing of foreign investment in major activities in the United States. Therefore, we were able to discover the ways in which European firms were buying into the seed industry.

Mr. Chairman, it seems to me that, when we talk about the Department of Agriculture facilitating foreign trade with the passage of the amendments to H.R. 999, we also need to ask how many of the profits from the seed trade in the United States are already flowing across the ocean to foreign owners.

Just this year another major seed firm, Coker, was announcing that it is now the property of a German corporation, KWS.

The European firms are coming, Mr. Chairman; many are already here. Many are in the membership of the American Seed Trade Association without revealing their true ownership is no longer American.

We are eager to protect the seed patents, the plant property rights of seed firms, but we seem to have no problems at all when the seed companies themselves becomes the property of foreign firms or large multinational corporations. I wonder, sir, how do we patent a small seed businessman to give him protection in his trade? How do we patent the rights of consumers to a dependable food supply?

As a consumer representative, I would like to raise this question. As an old farm boy, I grew Burpee seeds of many varieties when I was growing up. I had a great confidence in Burpee seeds until I learned quite recently that Burpee is no longer in the ownership and directorship of Mr. Burpee. Burpee is now the property of International Telephone & Telegraph. And about ITT I know; ITT puts wood chips in my bread and did not tell me about it until quite recently.

So, I have to ask this. When large multinational firms are buying up smaller seed firms, can we not suspect—and look carefully—if the strength and vitality of our seeds may be going the same way as the strength and vitality of other parts of the food chain as well.

Mr. Chairman, in 1968, as you are aware, the Secretary of Agriculture at that time, Orville Freeman, took a strong stand against

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certain parts of the Plant Variety Protection Act, essentially raising the question that to him it seemed impossible to legally patent a variety to the degree that its distinctiveness would be known and legally upheld. Unfortunately, in my mind, the Congress overruled the Secretary's admonitions, and the 1970 act was passed. We are now today debating, adding further amendments to that.

I would like to repeat again the concerns that the National Academy of Sciences raised. I wish, sir, that we had witnesses from the National Academy of Sciences and their fine report here with us today. They said that crops in the United States are impressively uniform genetically and impressively vulnerable.

After I read that, I waited to see if Congress would act in 1972 to recognize the danger, to increase the USDA's budget for collection and preservation. I waited to see if we could have a study on how the Plant Variety Protection Act would be affecting this whole problem of germ plasm research.

I waited, gentlemen, until I had the privilege of traveling to Mexico, where I visited the Center for the Improvement of Wheat and Corn, run by Dr. Norman Borlaug, the prize winner for the Green Revolution. Down there, Dr. Borlaug has gathered together renowned scientists from around the world whose experience with patenting in every country has been consistently negative.

Their concerns, gentlemen, are very simple. The essence of plant patenting, as Mr. Wampler has pointed out time and again, is the protection of certain property rights of the researchers of those plants.

Now, when you are in the business of trying to provide free plant materials to help underdeveloped nations to find foodstuffs for themselves, and when seed companies, trying to protect their own patent rights, have been able to convince other governments to allow certain kinds of patented materials to flow freely to question nonpatented materials, then you have the problem which CIMMYT confronts. They talk time and again of being prevented from having their materials to come into nations because of the plant patent situation.

Mr. Chairman, it seems to me the question before the subcommittee today is really simple. On the one hand, the Department of Agriculture, supported by the seed industry, contends, in the words of the USDA's impact study: "The proposed amendments have no bearing on health, safety, or other human concerns." To them this is a noncontroversial bill. And I did not have all that much controversy about it until I began to get my mail.

On the other hand, you have heard evidence today that raises some rather serious consequences that could emerge from this legislation. It seems clear the basic question is: Does seed patenting legislation contribute to a loss of genetic resources at home, and will our joining UPOV and promoting its goals increase the loss of those genetic resources abroad?

Consumers that I have spoken to, in the absence of any information to the contrary from the Department of Agriculture, have a strong affirmative to that question.

Finally, sir, it seems to me a great danger, when you read the National Academy of Sciences studies and realize that they talk about the extreme vulnerability of our major crops, that we are a

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Nation that depends upon the export of grain—both for the support of our farm communities and the support of our own food system as well as for needed foreign exchange—to have our genetic resources at such a low level.

As a consumer, I fear as well the kind of foreign policy consequences that will emerge. I understand that those nations most adept and most careful about preserving germ plasm genetic resources are those of the Soviet Union, where that began years and years ago, and those of Eastern Europe, which pride themselves on strong germ plasm genetic research programs.

I raise that as a foreign policy concern. I raise that as a concern of a consumer who wants to maintain a strong food supply system at home.

Finally, sir, I must believe, to the contrary of the statements of the Department of Agriculture, the vast experience and research at the United Nations Food and Agriculture Organization. The FAO's Director of Plant Production and Protection wrote just recently:

> As for the impact of plant varietal legislation on genetic resources it is a fact that where such legislation is in force, increased obstacles exist to the full and free exchange of germ plasm to which FAO and other U.N. agencies are dedicated. Plant varietal legislation is concerned with establishing proprietal rights over certain genetic resources and this cannot but have a limiting effect on their availability.

Sir, Consumers Federation 2 years ago took recognition of this problem in resolutions.

I must believe, Mr. Chairman, the 50 scientists of the National Academy of Sciences who said we do have extreme genetic vulnerability in our country. I must believe the Director of the United Nation's FAO that there is an inevitable link between plant patenting and genetic losses in our food system. I must bolieve, gentlemen, the concerns of Dr. Borlaug, the Nobel prize winner, are real.

I have visited Fort Collins. I see the situation there. I wish we could do more at Fort Collins.

My beliefs may be wrong, but I wish we had these other experts who have expressed their concerns about this issue before this subcommittee, before bill markup occurs, and before final deliberations occur.

I think we have heard today enough to cause us some cause for thought.

Finally, 2 days ago I received in the mail from England a list of illegal plants; it was shown to you before. I also received that list of plants already declared illegal and those to be declared illegal. The letter that accompanied it was from a gardener. It read as follows:

> I was writing a book on vegetable seed varieties for Penguin Books but I have had to cancel it because it is not possible for any writer to recommend any kind of plant in a book, for by the time the book is in print, the variety may be legally unobtainable.

Gentlemen, Will Rogers once said, "It's not what you pay a man that counts; it's what he costs you." I believe the present costs of this legislation have yet to be calculated.

Thank you.

[The prepared statement of Mr. McCurry follows:]

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TESTIMONY BY DAN McCURRY

CONSUMERS FEDERATION OF AMERICA

I'm Dan McCurry, a director of Consumers Federation of America, the nation's largest consumer organization, and organizer of the Consumers Coalition of Chicago where I make my home.

Consumers are increasingly alarmed about the genetic weakenesses in our food supply. We see these amendments to the Plant Varieties Protection Act as endangering the strength of our domestic food system. We see this bill as benefiting only a few of the major seed corporations who are so rapidly running our small seed businessmen out of business that they already have a monopoly in many sectors of the seed industry. We see this bill as pulling the United States into an international seed patenting organization whose goals have been sharply criticized by some of the most renowned scientists and plant breeders in the scientific community. And pulling us into this international organization, through the back door, without the full public discussion which is needed.

Finally, Mr. Chairman, we look at the European experience where major seed companies there have pressured those governments into declaring "illegal" hundreds of varieties of food producing plants. Plants can withstand uncounted generations of pestilence, drought, flood and wars. These plants can continue to make major contributions to the diets of us all and to the strength of our genetic pool. But these plants simply cannot withstand legislation which outlaws their production for sale, a law which fines the producer a heavy penalty. Plants are declared "illegal", Mr. Chairman, for the purpose of removing from the market any naturally occuring competition to those newly invented, newly patented, high-profit varieties. Consumers lose, farmers lose, gardeners lose when plant patenting brings the outlawing of certain plants. The only winners are patent attorneys who must fight a never-ending court battle to prove the "distinctiveness" of their variety, and those multinational seed companies who have found both a legal way to remove the competition of Mother Nature, and a financial method for destroying the small seed breeders. Those European firms, are presently in this country buying up U.S. seed companies with an eye to the same high profits. to which they have become accustomed in Europe under that plant patenting system. Since the passage of our Plant Varieties Protection Act of 1970, we have seen some of our largest seed firms go to European ownership. Firms such as Funk Seeds, now Ciba-Geigy of Switzerland; Agripro now Royal Dutch Shell, Jacques Seeds now Rorer--Amchem; and the list goes on. Mr. Chairman, this Congress saw the danger of foreign corporations buying up the wealth of our farmland. And the Congress moved to demand a regular listing of such firms and their holdings. Many states passed even stronger laws against foreign ownership of farm land. But the land remains barren without the seed.

The public, and the Congress, have yet to become aware of the large segments of our seed industry that are now under foreign ownership. Recently, Sandoz - a large Swiss petrochemical firm, purchased the major farm seed firm, Northrup-King. But we discovered this purchase of a seed company was the largest single foreign investment in the U.S. in that year.

More are to come, Mr. Chairman, many are already here, in the membership of the American Seed Trade Association, without revealing that their true ownership is no longer American.

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Mr. Chairman, how can the Department of Agriculture talk about these amendments, "facilitating foreign trade" without also showing how many of the profits from seed trade in the U.S. are already flowing across the ocean to their foreign owners? Just this year another major seed firm, Coker, was announcing that it is now the property of a German corporation, Kleinwanzieberer Swatzucht AG.

We are eager to protect the seed patents, the plant property rights of seed firms, but have no problems at all when the seed companies themselves become the property of foreign firms or large multinational corporations. How do we patent a small seed businessman to give him protection in his trade? How do we patent the rights of a consumer to a dependable food supply?

Several years ago, Mr. Burpee of Burpee Seed Company offered a prize for anyone breeding a special variety of flowers. Consumers and home gardeners eagerly responded. Before long, Burpee had received this flower, and was marketing it. The consuming public cooperated with Burpee because Burpee had produced many useful varieties of fruit, flowers and vegetables for their gardens and tables. A confidence had grown through the years.

But now Mr. Burpee is no longer the owner. Burpee Seed is the property of International Telephone and Telegraph (ITT). And ITT, Mr. Chairman, has been substituting wood chips in place of farm grown wheat flour in its bread. Will consumers place the confidence in ITT that they once held for Burpee? It is not likely. And what is to stop ITT, in the name of higher profits, from diluting the strength of its Burpee seeds, in the same way that it has diluted the taste of its bread? Nothing at all!

In 1968, consumers applauded the strong stand against a Plant Varieties Protection Act taken by Secretary of Agriculture Orville Freeman. In 1970, the Congress was urged by the seed industry to ignore the Secretary's warning and to pass this legislation. But even while this Congress deliberated, the genetic seeds of the 1970 corn blight were already present in our fields. A blight which destroyed up to one-third of the corn crop in many southern states, cost the nation and its farmers millions in lost trade revenues, and could be stopped only through emergency efforts with plant genetic material brought from Third World nations where such material is reported more rare each year.

I saw the corn on our North Carolina farm destroyed by this blight. We felt the economic hardship of that loss. And so I waited for the report of the National Academy of Science which was analyzing the causes and cures for such blights. That report was a frightening discovery.

"Most crops," the Academy reported, "are impressively uniform genetically and impressively vulnerable This uniformity derives from powerful economic and legislative forces." Most of those forces are in this room this afternoon.

Then I waited for Congress to recognize this danger, to increase the USDA budget for collection and preservation of plant materials. I waited for USDA to analyze how the Plant Varieties Protection Act might relate to the rapid drainage of our genetic pools.

I waited until I traveled to the Center for the Improvement of Corn and Wheat (CIMMYT) in Mexico. Directed by Norman Borlaug, a plant breeder and father of the "green revolution." Wheat from this center is planted on 30 million acres around the world, and corn from CIMMYT grows in over 48 countries with hungry populations to be fed.

The staff in Mexico explained their strong opposition to plant patenting laws. I heard that time and time again, patenting laws designed to protect the profitable seed material of the multinational seed firms had prevented the entrance into a nation of the free plant material from CIMMYT - the world's leader in such plant research.

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Mr. Chairman, the Center for the Improvement of Corn and Wheat is but a short two hour plane ride from your district. If you have not had the privledge of visiting CIMMYT and listening to the views of these leading international scientists, their views against plant patenting, I trust that you will chose to do so before the final mark-up of this legislation.

Such laws, Mr. Chairman, can not only discourage the use of such new plant materials to increase the world's food supply, but can create those market monopoly conditions within a country. This monopoly slowly drains that country of genetic material, adapted to those surroundings through thousands of years of growth, that could prevent even greater hunger in event of pestilence or adverse weather conditions.

Mr. Chairman, the question before this Committee today is simple. On the one hand, the Department of Agriculture, supported by the seed industry, contends, in the words of the USDA impact statement, that "the proposed amendments have no bearing on health, safety, civil rights or other human concerns." To them this is a truly non-controversial bill.

On the other hand, you have heard evidence today in my testimony and others, that raises some extremely serious consequences that could emerge from this legislation. The basic question is: Does this seed patenting legislation contribute to a loss of our genetic resources at home, and will our joining UPOV and promoting its goals increase the loss of those genetic resources abroad?

In the absence of any data from the Department of Agriculture, the consumer's reply to that question is a strong affirmative. We fear for our own food supply at home. And at a time when the U.S. lags far behind the Soviet Union and Eastern Europe in efforts to preserve genetic resources, we fear for the foreign policy consequences of USDA's ill-funded, dis-spirited efforts to preserve our genetic material.

A nation which uses grain as both foreign assistance and to secure needed trade balances, can ill afford to continue ignoring the great genetic peril in which our own grain crops exist. We have been warned by the National Academy of Scientists. And we have been warned by the United Nation's Food and Agriculture Organization. Only three months ago, the FAO's Director of Plant Production and Protection, Mr. O. Brauer, wrote:

> "As for the impact of plant varietal legislation on genetic resources it is a fact that where such legislation is in force, increased obstacles exist to the full and free exchange of germplasm to which FAO and other U.N. agencies are dedicated. Plant varietal legislation is concerned with establishing proprietal rights over certain genetic resources and this cannot but have a limiting effect on their availability."

In 1978, representatives of Consumer Federation of America's several million members gathered in Washington from local consumer groups, farm groups, labor unions, YWCA's, and others. These representatives adopted the following policy resolution:

> "Increased uniformity among our food producing plants is greatly endangering the genetic diversity vital to an agricultural system threatened by pestilance, and changing weather... Therefore we urge that USDA: 1)increase appropriations for preservation of and experimentation with local plant varieities. 2) encourage production and consumption of a larger number of varieties of our major food crops in its extension, marketing and feeding programs."

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Mr. Chairman, I believe the fifty scientists which the National Academy gathered to write on the Genetic Vulnerability of Major Crops in the U.S. I believe the Director of the United Nation's Food and Agriculture Organization that there is an inevitable link between plant patenting and genetic losses in our food system. I believe the concerns of the Nobel prize winner, Norman Borlaug, that plant patenting hinders efforts to use the genetic material of nations to feed themselves.

I have visited our Ft. Collins Seed Storage Laboratory, and I believe that the USDA must do many times more to support the vital work of germ plasm collection and utilization.

I may be wrong in my beliefs, but where are these highly prominent scientists, public officials, and others who have taken public opposition to plant patenting?

Have not the concerns which have been raised this afternoon -- concerns of producers and consumers alike, been sufficient to delay any action on this legislation? Have not these concerns been sufficient to request that the USDA do a much greater analysis of the impact of this legislation, and that other governmental agencies and international bodies such as FAO be consulted? Of what use, are those thousands of dollars which the National Academy of Sciences spent on their two studies, if not to inform the Congress and the people of legislation such as this? Where are the National Academy of Sciences' witnesses? I think a clear need has been demonstrated for continued hearings on this legislation.

Even though the U.S. has already helped in the rewriting of a UPOV convention and has signed that new convention, it has not the force of law until approved by this Congress. That approval should be in a full and open debate on the questions asked today. That debate should come only after oversight hearings on our present germplasm efforts. In the 1970 debate on the Plant Varieties Protection Act, both government and industry agreed that this program would benefit but a few major breeders, But that it would be practically self-sufficient through charging users fees. It is far from self-sufficient today. And in a time of budget cutting, we see again a program which benefits the most powerful few -- is being supported by many taxpayers and consumers.

Yesterday, I received in the mail from England, that list of illegal plants which the Committee has before it. A letter from an English gardener accompanied that list. It reads:

> "I was writing a book on vegetable seed varieties for Penguin Books (our famous paperback publishers) but I have had to cancel it, because it is not possible for any writer to recommend any kind in a book, for by the time the book is in print, the variety may by legally unobtainable."

Will Rogers once said, "It's not what you pay a man that counts. It's what he costs you." And Mr. Chairman, the costs of this legislation have yet to be calculated.

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Mr. DE LA GARZA. Thank you very much, Mr. McCurry. I appreciate your testimony.

We will have a vote on the floor soon. Are there any questions of Mr. McCurry that we could handle within the next 2 or 3 minutes?

Mr. WAMPLER. Mr. Chairman, I want to commend Mr. McCurry for his statement and for coming here. I want to assure you that I will carefully consider the points that have been raised here.

Unlike you, I have not had the opportunity of visiting our Fort Collins National Seed Storage Laboratory. I hope to one day.

I certainly think that your suggestion that the USDA could do more to support the work of germ plasm collection and utilization is probably true. I do not say that in a critical vein. I think it has been budgetary restraints that have kept us from doing it. I think that is something that this subcommittee could well take a look at and see if we cannot help in that regard.

You made many other very valid observations. You made your points very clear. We will certainly look at them.

Mr. MCCURRY. I appreciate your attention.

Mr. DE LA GARZA. Regardless of the outcome of this legislation, you have made some excellent suggestions as to areas of oversight that this subcommittee should be concerned with on this topic. I assure you that, as time permits, we will be doing that from time to time.

Congressman Roberts has given me a statement which, without objection, will be inserted into the record.

If there are no further questions, the subcommittee will stand adjourned, subject to the call of the chair.

[Whereupon, at 5 p.m., the subcommittee was adjourned, subject to the call of the Chair.]

[The statement referred to above and extraneous material submitted to the committee follow:]

STATEMENT OF HON. RAY ROBERTS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. Chairman, I would like to take this opportunity to urge my colleagues to support H.R. 999, the Plant Variety Protection Act. This legislation is needed to clarify the Plant Variety Protection Act of 1970 and to extend protection to six varieties of plants not covered in the original act.

This extension is necessary to protect developers of novel plant varieties by assuring them that they will have the exclusive rights to sell, reproduce, import or export their new products. The act would also protect those who purchase these new products against fraudulent advertising.

The legislation would not, as has been charged, concentrate the production of new plant varieties, but would actually encourage competition by providing protection to those wishing to enter the industry.

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STATEMENT OF CASTLE & COOKE, INC.
ON H.R. 999
AMENDMENTS TO THE PLANT VARIETY PROTECTION ACT OF 1970
BEFORE THE
SUBCOMMITTEE ON
DEPARTMENT INVESTIGATIONS, OVERSIGHT AND RESEARCH
OF THE
HOUSE COMMITTEE ON AGRICULTURE
MR. DE LA GARZA, CHAIRMAN

Mr. Chairman:

We appreciate the opportunity to submit a statement for the record in support of H.R. 999, Amendments to the Plant Variety Protection Act of 1970. The support for this legislation is extremely widespread throughout the agricultural community. We are pleased to join the Department of Agriculture, and others, in endorsing this legislation.

The Plant Variety Protection Act has been a major stimulant to the agriculture community in the development of new and unique varieties of edible plants. The original act, when passed in 1970, established a Plant Variety Protection Office in the Department of Agriculture. The office's purpose was to issue certificates of plant protection to developers of new strains and varieties of plants. The certificates granted the developer exclusive rights to sell, reproduce, import or export their plants for 17 years.

However, the original act did not extend its protection to six important vegetables: okra, celery, peppers, tomatoes, carrots, and cucumbers. H.R. 999 rectifies this situation by deleting section 144 of the current law and extending the protections provided by the Plant Variety Protection Act to these vegetables. Without such protection there is little incentive for growers to develop and improve new strains of these six basic vegetables. The bill also makes a number of technical changes which will make the law easier to understand and administer.

An example of the need for protection of these

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vegetables is the case of Bud Special Celery developed by Bud Antle, Inc. This special celery required over five years of testing and breeding before it was determined that a new variety had been developed which could be reliably reproduced. Bud Special Celery is less brittle than most celery and has superior bolting resistance. The new variety also has a greater resistance to certain plant diseases. However, our application for certification of Bud Special Celery was denied because celery is not currently eligible for the protection offered by the Plant Variety Protection Act. Without the protection of the Plant Variety Protection Act there is no incentive for growers to expend the time and money to develop new varieties with improved characteristics. Resourcefulness and ingenuity have always been characteristic of American agriculture. These traits should be encouraged.

The benefits of the Plant Variety Protection Act are very real. Since the enactment of the Act both the number of breeders and new varieties have increased. The Act has enhanced the storage and protection capabilities for both new and existing varieties. In short, the Act is a success and it is appropriate to extend the coverage of the Act as proposed. H.R. 999 ensures that new and superior varieties of the six vegetables currently excluded from the benefits of the Act will be afforded adequate protection when appropriate. Whether it be Bud Special Celery or some other vegetable variety deserving protection, the passage of H.R. 999 will be a benefit to the agricultural community and consumers alike.

Again, we appreciate the opportunity to submit testimony before the Subcommittee and urge the Subcommittee to report favorably the bill H.R. 999, Plant Variety Protection Act Amendments.

Thank you.

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PLANT VARIETY PROTECTION ACT AMENDMENTS

TUESDAY, APRIL 22, 1980

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON DEPARTMENT INVESTIGATIONS,
OVERSIGHT, AND RESEARCH OF THE
COMMITTEE ON AGRICULTURE,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10 a.m., in room 1301, Longworth House Office Building, Hon. E de la Garza (chairman of the subcommittee) presiding.

Present: Representatives Brown, Skelton, Wampler, and Grassley.

Also present: Representatives Stenholm and Marlenee.

Staff present: John E. Hogan, counsel; Glenda Temple, clerk; Thomas E. Adams, Bernard Brenner, Anita R. Brown, A. Mario Castillo, Kathleen Garvin, Gerald R. Jorgensen, and Bert Pena.

OPENING REMARKS OF HON. E DE LA GARZA, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. DE LA GARZA. The subcommittee will be in order.

Today we have a continuation of hearings on H.R. 999.

We have extended an invitation to independent scientists to present testimony to this subcommittee during these hearings addressing some concerns that have come up and to give the subcommittee an opportunity to ask questions and review all aspects of the concerns that have been expressed.

The USDA presented testimony in favor of the amendments now pending during the July hearings.

Today we have Dr. Quentin Jones who is staff scientist of the Science and Education Administration. He will answer questions on the research program.

Dr. Jones' expertise lies solely with the germplasm research which is the responsibility of the Science and Education Administration in the Department of Agriculture.

The Plant Variety Protection Act is administered by the Agricultural Marketing Service of the Department of Agriculture.

Bernard M. Leese, Commissioner of Plant Variety Protection Office of AMS is also present to brief the subcommittee on the issue brief prepared by USDA and to answer our questions on law and proposed amendments.

These hearings have been scheduled for both morning and afternoon sessions in order that all interested persons and organizations may be heard, that is, today. It is the intent of the hearing to provide ample opportunity for all interested parties to present

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their views. This is mainly our interest because somehow some gross misinformation about this legislation has been spread out throughout the country and bandied around to such an extent that it has become somewhat of an emotional issue. This has been mostly by people who were completely uninformed but they were aroused by misinformation put out as to possibilities or future possibilities, up to and including bringing about the end of the world if this bill were to pass.

In order to satisfy everyone who has voiced some concern is the reason for these hearings, not wanting at all for anyone to feel that they were not heard. We want to clarify these things because, as I said, a radio station in San Antonio, Tex., read an excerpt from information which they had received opposing the legislation. This prompted several letters personally to our office. Upon having given the facts as we know them, that is, the truth of the why and wherefore of the legislation to the talk show in San Antonio, he was not only so embarrassed but actually on the air withdrew his supposed opposition and admitted that all of the information which had been given him, which was an emotional response-type, was incorrect.

That is the type of thing that we are trying to avoid. If anyone has a legitimate concern, this is the place to air it. That is the reason for the hearings.

Mr. Wampler?

Mr. WAMPLER. I have no questions, Mr. Chairman.

Mr. DE LA GARZA. The Chair will now call Mr. Quentin Jones and Mr. Bernard Leese.

We welcome you this morning, Mr. Jones and Mr. Leese.

As I understand it, neither of you has a prepared statement. Is that correct?

Mr. JONES. That is correct.

Mr. LEESE. That is correct.

Mr. DE LA GARZA. Who is the one who is prepared to tell us about the USDA brief on the policy?

Mr. LEESE. I am, concerning the bill before the House, Mr. Chairman.

Mr. DE LA GARZA. Please proceed as you see fit, Mr. Leese.

STATEMENT OF BERNARD M. LEESE, JR., COMMISSIONER, PLANT VARIETY PROTECTION, AGRICULTURAL MARKETING SERVICE, U.S. DEPARTMENT OF AGRICULTURE, ACCOMPANIED BY QUENTIN JONES, STAFF SCIENTIST, PLANT INTRODUCTION AND NARCOTICS, SCIENCE AND EDUCATION ADMINISTRATION

Mr. LEESE. Thank you, Mr. Chairman.

We have issued an update paper which was developed by the Departments of State, Commerce, and Agriculture in reply to questions that were raised at the hearings on July 19, 1979. The main purpose of these two bills, H.R. 999 and S. 2844, which are identical bills, is to add vegetable species or crops to the Plant Variety Protection Act that now protects more than about 350 species.

The purpose of the act is to give patent-type of protection or breeder's rights to individuals who have developed new plant varieties.

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Participation under this act is, of course, voluntary. The act has no regulatory function, nor does it control varieties in channels of commerce or regulate what the consumer can do with those varieties. Therefore, the act does not restrict germplasm. The act does not control the number and kinds of varieties available to the public. It does not protect only large companies. It does not lead to the unfair marketing practices because the act does not regulate commerce. It does not endanger the food supply.

However, the act does encourage development of new and diverse varieties. It does encourage the conservation and maintenance of germplasm. It does require more detailed descriptions of varieties of germplasm, and it does encourage the computerization and description of varieties. Besides that, it does help develop new companies breeding new varieties due to the protection of their resources.

If you have questions during the hearing on this bill, I would be glad to answer those questions.

Thank you, Mr. Chairman.

Mr. DE LA GARZA. Thank you very much.

Does any member have questions at this time?

Mr. Leese, let us emphasize for the record again that there are basically some 350 species now that are under the act. Is that correct?

Mr. LEESE. These can be protected under the act because they can be reproduced sexually.

Mr. DE LA GARZA. All this bill does is add six more to the list?

Mr. LEESE. Yes, six more vegetable species or crops.

Mr. DE LA GARZA. One of the concerns that has been expressed is that this would forever prohibit anyone from growing a little garden in the back, a little home garden. Can you find that conceivable under this legislation?

Mr. LEESE. This is not conceivable at all under this legislation. In fact, there are in the regulations also the privileges to farmers to reproduce their own seed of protective varieties and plant these in their fields for increase in commodities. It also reserves the right for individuals to take these protected varieties and use them in breeding techniques or using this germplasm which is a new protective variety to develop new varieties from that material.

Mr. DE LA GARZA. The individual and the farmer can do that? Is that correct?

Mr. LEESE. That is correct.

Mr. DE LA GARZA. There has been some question as to this conceivably increasing the price of seed, that is, what you buy at the hardware and grocery stores. In and of itself could you foresee this legislation doing that?

Mr. LEESE. No, sir. In fact, we reviewed some of the prices on seeds and found that it varies according to the productivity of the variety as how much its seed will produce, and this is one of the criteria for developing inexpensive seed, that is, the productivity of that variety.

Mr. DE LA GARZA. There has been some of that information that I was speaking about, or rather misinformation, that calls this act a nightmare—it would be a nightmare to enforce since it is so difficult to technically define and verify what plant varieties are and, if so, what these amendments to the act will be and do.

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From your professional standpoint, do you think it would be such a nightmare that it could not be a usable tool in this endeavor?

Mr. LEESE. I do not believe so. I think it is very important to indicate that we require a very objective description of the variety and also an objective character that will distinguish a protected variety from all other varieties.

As I know at the present time there perhaps has been three or four suits in the United States concerning protected varieties. One of these was in California over a lima bean. It was a misunderstanding from the standpoint of the variety concerned that the variety could not be used to develop a new variety of lima bean. This was a misunderstanding of the law, and it was settled without legislation or legal action.

The other case was a barley up in North Dakota. That, I understand, is still in progress as far as the legal work is being handled, and there is a cotton at the present time now in Texas. However, these are the only three areas of legal actions under the act that I know of.

Mr. DE LA GARZA. There has been some information which I have seen which implies that somehow this act is a communist plot to take over basically the United States, I guess by controlling its ability to produce food and fiber. By any stretch of the imagination, could you foresee that anything like this?

Mr. LEESE. I most certainly do not because it is actually more or less a private act which gives individual rights to individuals to develop a new variety as a piece of property. I cannot see how communism would affect giving individuals rights. Rights are taken away from individuals under communism.

Mr. DE LA GARZA. This same has been mentioned of the European community—that somehow this is a plot of the EEC to control the food and fiber of the United States. Do you foresee this as a possibility?

Mr. LEESE. No; in fact, the plant patent laws in Europe are distinct from the EEC regulations, the community regulations.

Mr. DE LA GARZA. Do you foresee any problem regarding the Plant Variety Protection Act and genetic uniformity?

Mr. LEESE. Definitely not. I think in many cases when an investment is protected under the plant Variety Protection Act, the breeder will go further in developing different germplasm to be put together to develop new varieties. Consequently, we will under the act restrict what we have seen in the past of selecting older varieties and reproducing these as new varieties.

Mr. DE LA GARZA. Because of the technicality of this, I, of course, would accept your qualifications as an expert witness in this matter. But just for the record, what is your background in this field?

Mr. LEESE. Basically I have about 13 years of research and about the same amount in marketing areas. I started out in the Plant Introduction Office as a plant explorer and identifying germplasm. I left that in 1961 to work with seed testing laboratories. I have supervised seed testing laboratories all over the country, and was doing work in standardization and quality control.

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I went back with the Plant Introduction Office in 1967 to go to Ethiopia and collect germplasm for sorghums, and millets, and spent 4 months in Ethiopia collecting germplasm.

This was for the Rockefeller Foundation, and also for the world collections of germplasm of sorghum house in Jowar, India.

At that time I had recommended the collection of sorghum in India be transferred to Ethiopia, because it was difficult getting material out of India. I am happy that it was not transferred.

After that I came back with the Seed Branch and worked there until 1970, and then I assisted in setting up the office of the Plant Variety Protection Office. This is my career in agriculture.

Mr. DE LA GARZA. As an individual in the position where you are, if this bill passes or does not pass, would it have any effect on your particular employment?

Mr. LEESE. At the present time I can retire. However, I feel that there is a lot to gather in our work. I am very concerned about germplasm, and I think that the operation that we are doing at the present time helps identify germplasm, which is very important.

We put this information on the computer, and we also send 2,500 seeds to the Fort Collins National Seed Storage Laboratory for reference samples. These seeds are maintained and the responsibility of maintaining these seeds is the breeders that produce that variety. So, for 17 years he must maintain the seed in a viable condition or he loses his certificate of protection.

Mr. DE LA GARZA. There has been some question of the Fort Collins storage vault. Do you see that as adequate or inadequate?

Mr. LEESE. I would like for Dr. Jones to answer that question. I have been out of that area for 15 years or so.

Mr. DE LA GARZA. Thank you very much for your participation.

Mr. LEESE. Thank you.

Mr. DE LA GARZA. Mr. Jones?

Mr. JONES. Mr. Chairman, I would be happy to speak to that. We have maintained on the order of 350,000 accessions of germplasm at the National Seed Storage Laboratory in Fort Collins. We monitor the viability of this material on a routine basis. That is to check to see that it germinates at a high percentage. That facility has been in operation now for 21 years.

All seed that was put in there in good quality loses very, very little in the way of germination percentage. In that 21-year period most of it has lost barely a detectable level of viability.

This does not mean to say that we are not constantly researching better ways to store seed. We are investigating the possibility of storing them in liquid nitrogen. We are also investigating the effectiveness of storing them at lower relative humidity and lower temperatures than what might just be called the cold temperature range—much short of that of liquid nitrogen.

We are also investigating ways that they can be storod in terms of how they are packaged to prevent exchange of moisture with the ambient air. So, on the one hand, I would say that it is doing an effective job but one that probably will be improved upon as we learn more about it through research on seed storage requirements.

Mr. DE LA GARZA. I have a doctor friend here in Virginia who has a little greenhouse. He spends some of his spare time working in

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the garden. I have started a chili patch up here every summer. I bring the seed for jalapenos, about eight different varieties, from south Texas in a little plastic bag. I bring it to him, and he starts the plants for me. About May, in about a couple of weeks from now, I will go over to his place and take him a bottle of tequila and take my plants.

Can we continue doing that under this bill? Or, would there be some restriction that we could not do that?

Mr. LEESE. Yes; Mr. Chairman, you may continue to do that. There is no regulatory function at all under the Plant Variety Protection Act.

Mr. DE LA GARZA. I dry out the jalapeno pepper myself and take the seeds out. I can still continue to do that?

Mr. LEESE. Yes; you may.

Mr. DE LA GARZA. That is a relief to me. From reading some of that mail, I was getting scared.

Mr. Stenholm, do you have any questions?

Mr. STENHOLM. No.

Mr. DE LA GARZA.Mr. Wampler?

Mr. WAMPLER. Mr. Leese, inasmuch as there is international interest in genetic plant resources and germplasm programs, what is the status of the United States joining the International Union for the Protection of New Varieties of Plants?

Mr. LEESE. At the present time we have signed the convention on October 28, 1978. That signature is to indicate that we agree with the new convention. I have to add that we spent about 5 years revising that convention and participated in that convention. We feel that it is a convention that is not only practical for the European communities, but it is also practical for worldwide participation. We consider it our convention.

I believe there are several countries waiting for us to see what we are going to do about it.

Mr. WAMPLER. Thank you, Mr. Chairman.

Mr. DE LA GARZA. We thank both of you for your availability this morning, and we appreciate your contribution.

Mr. LEESE. Thank you.

Mr. JONES. Thank you, Mr. Chairman.

Mr. DE LA GARZA. Our next witness is Dr. George Sprague of the University of Illinois.

We welcome you, Dr. Sprague, and will be delighted to hear from you at this time.

STATEMENT OF GEORGE F. SPRAGUE, PROFESSOR OF PLANT BREEDING AND GENETICS, UNIVERSITY OF ILLINOIS, URBANA, ILL.

Mr. SPRAGUE. Thank you, Mr. Chairman.

My name is George F. Sprague, professor of genetics and plant breeding at the University of Illinois. Previously I was employed by the U.S. Dopartment of Agriculture engaged in research on genetics and breeding of corn.

U.S. agriculture is uniquely dependent upon plant introductions. In all of our earlier years these introduced varieties were used more or less directly as introduced. In more recent years they have

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been rather drastically modified to suit our different ecological and production systems.

Because of our dependence on germplasm resources there has been considerable effort developed through the years to collections of most of our important varieties and, as Dr. Jones indicated earlier, this material is apparently storod at Fort Collins.

We also have access to germplasm collections in many other areas of the world. The world germplasm resources for any given species can be thought of as this consolidated group of collections, not only in the United States, but in other areas, and this material, of course, represents tremendous diversity of form and color, and response to environment, and other traits of that sort.

The subset of this total collection is one that is of primary concern to the breeders. This would include the group of things that were adapted to a given geographical area, the geographical area in which he is engaged as a plant breeder or research worker.

Then there is still a third subdivision of this germplasm collection. This would include the varieties which are of importance commercially in a given area and the near-term replacements of the currently grown varieties. The commercial varieties and their near-term replacements do not represent any loss in germplasm because they in turn become a part of the total germplasm collection. So they can be used for other research work at any time.

The process of plant breeding is primarily one of selecting material which is suited to a given set of environmental conditions or a given set of production practices. The task of combining into a single variety all of the attributes that are necessary for a successful culture means that very intense selection has to be practiced. This, in turn, means that the varieties as they are ready for market tend to have a very high degree of uniformity.

There may, however, be striking difference between varieties, or among varieties grown in a given area.

This high degree of uniformity has often been criticized as being undesirable. but, on the other hand, it is a necessary element. The housewife demands uniformity. She wants to have the produce she picks up at the market of uniform maturity and uniform size, color, and so on. The commercial processor, the wheat miller, for example, needs to have wheat of uniform quality in order to satisfy demands for production of bread, for the production of flour for cakes and cookies.

There is also a requirement for uniformity under the Federal seed laws. The variety has to be described in such a fashion that it can be recognized and that, therefore, if a variety is sold under a particular name, it can be verified as to the fact that the product sold is actually that variety.

This high degree of uniformity may be undesirable from the standpoint of genetic vulnerability. The only solution to this problem is the availability of a large number of varieties among which the grower can make his selection. this means, then, that the solution to this problem is intensification of the plant breeding and development process.

Thank you, Mr. Chairman.

Mr. DE LA GARZA. Thank you very much, sir. We appreciate your being here.

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Are there any questions of Dr. Sprague?

Dr. Sprague, this is just for my own information, periodically in my area you see a stand of sorghum and maybe every couple of hundred square feet you will see a shoot that comes out way above the uniform. There may be 2 or 3 in 100 square feet. What causes this?

Mr. SPRAGUE. In sorghum there are four different height genes that are involved. We commonly grow in the United States the so-called three-dwarf and four-dwarf types. Unfortunately, one of these dwarfing genes has the high rate of mutation and it mutates to a taller version something less than in the order of 1 in 10,000—that is a mutation process. That is, rather, the result of the mutation process.

Mr. DE LA GARZA. Is there anything in this bill that would in any way affect that one way or another?

Mr. SPRAGUE. None whatever than I can see.

Mr. DE LA GARZA. Thank you very much, sir. We certainly appreciate your being here today.

Mr. SPRAGUE. Thank you.

[The prepared statement of Mr. Sprague follows:]

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George F. Sprague, Professor of Genetics and Plant Breeding
University of Illinois

Mr. Chairman: My name is George F. Sprague, Professor of Genetics and Plant Breeding at the University of Illinois. Previously I was employed by the United States Department of Agriculture engaged in research on genetics and breeding of corn. At the time of my retirement from U.S.D.A. my position was Leader, Corn and Sorghum Investigations.

Plant introductions have played an important role in U.S. Agriculture and remain one bulwark against the continuing hazards of genetic vulnerability. In the 17th and 18th centuries many of the strains introduced were used either directly or after slight modifications. However by the 19th century few introductions were found to be directly useful per se. The most notable exception would be Turkey wheat introduced by the Mennonite settlers in Kansas about 1870. In this century most introductions have been useful as sources of either disease or insect resistance which could be incorporated into adapted varieties. It appears likely that this pattern of indirect usage will become of increasing importance.

As breeding and evaluation facilities are often limited within third World countries it is conceivable that selected variants from introductions may have increased usefulness when returned to the country of origin. To date, however, this possibility has been of very little importance as disease and insect problems are also ecologically limited.

The Worlds germplasm resources for any given species may be visualized as falling into one of three categories. The first and largest category includes the vast array of materials, collected or uncollected, cultivated or wild, which falls within a single genus or broader interbreeding group. It is at this level that the greatest genetic diversity exists; variation in size, form, color, response to daylength, to various insect or disease pests and many other traits which may or may not be useful to man.

The second category is a subset of the first and includes those items which are adapted to a particular ecological zone and therefore directly utilizable for culture in a given region e.g. the Corn Belt of the United States. Breeders seeking to improve a crop make extensive use of this sub-set of materials.

The third category, very restricted in size, includes the improved varieties in commercial culture and their near-term potential replacements. Each individual item within this group tends to be highly uniform but yet differ substantially in at least one regard from other items in the same category. When grown on large acreages the uniformity of a single variety

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may increase the likelihood of damage from some new race of a disease or new biotype of a damaging insect. Thus at the commercial level there is a marked reduction in genetic diversity. However, the total pool of genetic diversity remains intact as the items comprising categories one and two are still available for further modification or use as circumstances dictate. Both the new varieties entering commercial production and the varieties they may replace also remain as a part of the total germplasm pool.

In its simplest form plant breeding involves the development of new cultivars specifically adapted to a given set of ecological conditions and a given production system e.g. varieties well suited to the home garden might not have maximum efficiency under large scale production systems. The breeding and selection criteria imposed to combine into a single cultivar all of the required characteristics, form, color, maturity, resistance to pests, etc., insures that the final product will have a rather high degree of uniformity. This uniformity is a result of the selection practiced; varieties developed by a public agency, the U. S. Department of Agriculture or any of the Land Grant Institution, would be as uniform as those developed by a commercial seed firm. The possibility of varietal protection has little if any relation to the methods used in cultivar development. Varietal protection enters the picture only as a method of recouping the research costs of development so as to permit of an expanded plant breeding effort. Plant breeding remains one of the most important routes in achieving increased agricultural productivity.

Although uniformity of product is a consequence of plant breeding activity it is also a requirement demanded by the housewife, commercial processors and the Federal Seed Laws. The housewife demands that the produce she buys be uniform in size, shape, color and maturity. Any wheat cultivar must be uniform in physical and chemical properties to produce an acceptable flour for baking, for cakes and cookies or for the production of semolina for pasta products. Similarly vegetables or fruit grown for freezing or canning must be uniform in appearance and maturity to achieve an acceptable commercial product. Finally, uniformity is a requirement under the Federal Seed Laws. This is to provide assurance that a seed lot sold under a given designation is in fact the variety indicated. Distinction among varieties can be assessed only if they posses clearly identifiable characteristics.

A high degree of uniformity becomes an undesirability only when large acreages are devoted to a single variety. Avoidence of this problem is dependent upon the availability of a number of acceptable varieties from which the grower may choose.

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Mr. DE LA GARZA. The next witness is Dr. A. A. Hanson.

Mr. LEWIS. Inasmuch as Dr. Hanson could not be here, he has asked me to present his testimony, with your permission, Mr. Chairman.

Mr. DE LA GARZA. That will be fine, Mr. Lewis. We welcome you and will be happy to hear from you at this time on behalf of Dr. Hanson as well as any personal additional comments that you might like to make.

STATEMENT OF A. A. HANSON, WATERMAN-LOOMIS CO., HIGHLAND, MD.; FORMER DIRECTOR, AGRICULTURAL RESEARCH CENTER, BELTSVILLE, MD., PRESENTED BY CHARLES F. LEWIS

Mr. LEWIS. Thank you, Mr. Chairman.

Dr. Hanson was the former director of the Beltsville Agricultural Research Center. In that capacity, he served as the U.S. Designated Authority to the OEDC—Organization for Economic Cooperation and Dovelopment—seed schemes. He was also the informal point of contact for seed schemes developed by the European Community. Currently, Dr. Hanson is the director of research for the Waterman-Loomis Co., which develops and markets proprietary alfalfa varieties.

From this point on, Mr. Chairman, I will stick fairly closely to his prepared text. I will let you know if I editorialize. I will now read Dr. Hanson's statement.

I will direct my remarks to the so-called European experience as it applies to the relationship between plant variety protection and regulations imposed by the European Community or common market.

There are major differences between Europe and the United States in the extent of government control over the marketing of varieties of vegetable species and agricultural plant species.

For many years, a number of European countries have maintained national lists of varieties that restrict seed sales to approved varieties. Varieties are evaluated in official government tests and failure of a variety to meet established standards of performance preclude the sale and use of the variety. Furthermore, maintenance of a national list of approved varieties is supported by an elaborate system of official growing-out tests designed to verify the trueness-to-type of seed lots offered for sale in the country.

This particular approach can be described as a consumer protection program based on the premise that farmers and market gardeners must be protected from planting seed of inferior varieties as judged by official tests.

Merit is the major criteria for inclusion of a variety on a national list of approved varieties, and lists include both domestic and foreign varieties which may or may not be protected by plant variety protection legislation.

It is important to realize that the European seed trade is not supportive of this approach to controlling the introduction and use of improved varieties. They consider the mechanism as cumbersome, costly, and restrictive from the standpoint of introduing newer varieties that could be of immediate benefit to farmers.

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In the United States, we have recognized the deficiencies of official testing programs in identifying the value of crop varieties when used over the wide range of environmental conditions encountered in this country. In addition to the problem of determining the true merit of a variety, one must consider the enormous cost of these programs, especially when coupled with post-control verification of the seed lots.

In the United States we have emphasized the importance of providing information and counting on an informed public to make rational decisions. Some States make the results of evaluation tests available to farmers and growers but make no recommendations. If recommendations are made, then individuals are still free to select and plant the variety of their choice. According to Dr. Hanson, there is no prospect whatsoever that the United States will adopt the European approach to restricting the sale and use of varieties of vegetable and field crops.

He points out that plant variety protection in the United States, in Europe, and elsewhere does not and will never provide control over the varieties that are made available to the public. Control of planting stock is a regulatory function that is completely separate and distinct from plant variety protection.

The Europeans faced a problem with respect to foreign and domestic crop varieties, seeds of which were produced in other countries and imported into Europe for domestic use.

Although these varieties would be on the national list, the seed would have been planted before the official post control tests showed discrepancies in performance resulting from some genetic changes during seed multiplication, admixtures in seed harvesting, and conditioning or just out-and-out misrepresentation of what was in the bag.

In an effort to minimize the impact of these problems, a mechanism for seed certification was developed under the auspices of the OECD.

The United States is a member of OECD which, according to its convention, was established to promote, among other things, "the expansion of world trade on a multilateral, nondiscriminatory basis in accordance with international obligations."

Over the past several years, OECD has developed a number of seed schemes for the varietal certification of seed moving in international trade. These seed schemes include provisions for monitoring the movement of breeder seed, foundation seed, and certified seed to insure the genetic purity of varieties. The Vegetable Seed Scheme is an exception in that they have a "Standard Seed Category" which is not certified by any official seed certifying agency.

These seed schemes adopted by the Common Market have been coordinated with those adopted by the OECD. Therefore, importation of seed provided outside the Common Market must meet the established OECD for genetic purity, plus the Common Market requirement for seed quality.

The Common Market has developed Common Catalogs for approved varieties of vegetable species and for agricultural plant species. These Common Catalogs are based on national list of approved varieties received from member countries after screening to eliminate any duplication which could occur from using different

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names for the same variety. Thus, the Common Catalogs list all varieties. A maintenance plant breeder or organization must be identified for each variety and provisions made for the inspection of the seed maintenance program if irregularities are found in the post-control testing of a variety.

Dr. Hanson concludes by saying that the citing of the European experience as grounds for opposing plant variety protection legislation in the United States is unjustified, because regulations imposed by the Common Market bear no relationship whatsoever to protecting the contributions of plant breeders.

I will appear again this afternoon, Mr. Chairman, so I will not add any comments to Dr. Hanson's report.

Mr. DE LA GARZA. Thank you very much, sir. We appreciate very much your appearing on behalf of Dr. Hanson.

The next witness is Ginger Nelson from the National Center for Appropriate Technology, Washington, D.C. We are happy to have you here today.

STATEMENT OF GINGER NELSON, THE NATIONAL CENTER FOR APPROPRIATE TECHNOLOGY, BUTTE, MONT.

Ms. NELSON. I am pleased to have the opportunity to speak before you today regarding the proposed amendment to the Plant Variety Pretection Act.

The National Center for Appropriate Technology (NCAT) is a nonprofit corporation with its headquarters in Butte, Mont. It was established 3 years ago through a grant from the Community Services Administration to develop and apply appropriate community-based technology to meet the specific needs of low-income people and to promote locally based programs that develop individual-based and community-based self-reliance.

Our agriculture program includes the study and promotion of attached solar greenhouses to be used as additional heat sources for the home, as well as a tool to allow access to nutritious fresh vegetables year round. We are also doing work with cold frames to extend the growing season, bed-depth studies on various home-grown varieties, studies of biological pest management, organic methods of growing and alternative farmer to consumer marketing systems.

We are concerned with many of the facets involved with the issue of plant patenting. These include the potential crisis of genetic uniformity and disease vulnerability, enforcement procedures and their effects—including the loss of local germplasm resources—and the philosophical implications of private ownership of genetic plant material that was virtually imported to this country to begin with and which was essentially developed to its current state over generations of improvements made by independent farmers and public research. Because of NCAT's mission to help create a balance between people and their environment and to the promotion of self-reliance and self-sufficiency among the poor, I plan to focus primarily on the issues of the rights of individual farmers and gardeners to access and control over their source of supply, their right to have input into the direction of research, the potential increase in the cost of seed produced by private interests, the rights of consumers to a quality product, and the need for further study

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by the Dopartment of Agriculture or another agency, on the whole issue.

ACCESS TO SEED/DIRECTION OF RESEARCH

The whole philosophy behind the appropriate technology movement can be summed up in the words of E. F. Schumacher, in his book "Small is Beautiful": Technology of production by the masses, making use of the best modern knowledge and exporience conducive to decentralization, compatible with the laws of ecology, gentle in its use of scarce resources, and designed to serve the human person instead of making him the servant of machines.

The emphasis here is on decentralization of control and access to the necessities of life. This concept necessarily is in conflict with the consolidation of seed companies by large corporations within the past few years. This rapid consolidation has largely gone unnoticed and began shortly after the Plant Protection Act was passed. Studies have not been done to see what relationship there is between the passing of the act and the interest in purchasing seed companies by large corporations.

We have many concerns over the direction of research under large private corporations. The research efforts in the United States should be toward developing plants that are more pest resistant and hardy, and require less additional fertilizers and nutrients to be added to the soil. There is concern that a corporation dealing in fungicides or pesticides might have a subtle bias against problems that perhaps they don't even perceive, if they have a product that deals with the control of that problem sitting on the shelf. There are also instances in Europe, for example Lutin Wheat, which is being offered as a packaged deal, seed, and pest control chemicals together, all in one package. There is concern here over the potential of increased expense to the farmer as well as that of increased use of pesticides.

As private industry takes over, the public loses control over the direction of research. Companies will have a tendency to do what is best for the company rather than what is best for the farmer or gardener. The real profits seem to be in the area of hybrids, which are not covered by the act, but are profitable to large companies because the farmer or gardener must return yearly to purchase additional seed. With standard (nonhybrid) seed, he can save the seed to use the following year. As an example of the access to seeds problem, it is reported that Burpee Seeds, in a case where they had been offering two varieties of standard corn for the home gardener, offered in 1979, two hybrid varieties and suggested that they be used instead, even though the patent protection is offered for the open pollinated variety. (Article by Jennifer Bennett; *Harrowsmith*, vol. IV, No. 2, September 1979.)

COST OF SEED

Since the original act in 1970, seed has been the fastest rising farm price. The National Science Foundation has done a study that shows that before 1970, prices had followed crop prices. Now, there is no relationship; the Department of Agriculture has done no study to see why this is so. In the case related above, of the switch in varieties of corn offered by Burpee for similar crops from the

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standard seed to the hybrid seed, the hybrid seed was 50 percent more expensive that the standard seed they had offered before.

RIGHTS OF CONSUMERS TO A QUALITY PRODUCT

Today, even within the area of public research, plant breeding has a tendency to create varieties which are of greatest value to commercial interests. With tomatoes, for instance, we already have a situation where emphasis is on varieties which have thick skins—they stand up to transport over long distances—and which are particularly susceptible to ethylene gassing—to get a ripe looking immature product. These "rod rocks" as I love to call them, bear little resemblance to the tomatoes out of our own gardens or those grown locally.

We already have this tendency toward developing varieties adaptable to commercial exploitation within publicly funded research. This is due mostly to limited research dollars and a necessary emphasis on developing basic genetic material. Because of this situation, they are forced to develop material that is of value to large businesses. There needs to be more research into the areas that should concern consumers most—having quality products, high in nutritional value at time of sale, available at a reasonable cost. "A patent doesn't mean it's good," says Charles Phillips of Seeds Canada. "It just means it's different." (P. R. Mooney, Seeds of the Earth, p. 73.)

FURTHER STUDY NEEDED BY USDA

Before 1970, during the Johnson administration, the USDA stance on this issue was against the patenting of seeds. In 1968, Secretary of Agriculture, Orville L. Freeman voiced concern over the issue and argued that any restrictions to the exchange of germplasm would have hindered the development of U.S. agriculture. Even so, the Plant Variety Protection Act was hurriedly passed by Congress in 1970. And, since that time, the effects of this legislation remains an unknown.

The Dopartment of Agriculture has not:

Examined the relationship between the Plant Variety Protection Act and the takeover of the seed companies by multinational corporations.

Examined the effects on seed prices and industry consolidation.

Examined the vulnerability of our tendency to breed uniform varieties and their use worldwide.

This is an issue which should have been included and considered in Secretary Bergland's structure project. To my knowledge, his national dialog on farm structure, which included wide-ranging, informed discussion of our agriculture options, did not include a look at this issue as an "emerging issue affecting structure." Farmers and the environmental community need to discuss the large-scale changes taking place in the seed industry and at least open a discussion on whether this is good or bad—or a neutral policy. (See attached information prepared by the Presidential Commission on World Hunger.)

Small farmers, low-income people, and consumers in general cannot bear an increase in price and control over this very basis of

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our food delivery system. Most of this research belongs in the public domain where the cost of seed development is borne by everyone benefiting from its advancements; where concern for the consumer's needs for a quality, tasteful, and nutritious vegetable is of utmost importance, and where we do not let ourselves believe that we can rely more and more on corporate interests to be responsible for developing and maintaining a system of agriculture that is in the long-term best interest of this country as well as maintaining the ecological balance of plant varieties throughout the world. (See attached statement from A Regional Catholic Bishops' Statement on Land Issues, 1980.)

As a society we have to pay for plant breeding and seed either directly or indirectly. Whether we end up paying corporate breeders will be determined by the wisdom of those who fund government breeding programs and who create legislation that affects one of the most fundamental facets of food production in the United States. This issue will help shape the future of agriculture in this country and around the world and it deserves much closer examination.

This bill should not be passed. A number of studies should be done before any action is taken. There needs to be a response to the questions raised during testimony last summer as well as the ones raised here today before we chart a course which includes issues of such magnitude.

[Attachments to the statement are held in the subcommittee file.]

Mr. DE LA GARZA. Thank you very much, Ms. Nelson.

Mr. Wampler?

Mr. WAMPLER. I have one brief question, and I suppose an observation also, Mr. Chairman.

Ms. Nelson, I thank you for your statement. I would just like to comment that among my other responsibilities in Congress, I am currently serving as a conferee on the so-called synthetic fuels conference. It involves a number of very complex issues. We are moving slowly, but I think very judiciously in trying to come up with something that resembles an effective national policy on synthetic fuels.

We have tentatively agreed in the conference to extend tax credits and other inducements and incentives for the application of solar energy. I notice that your organization does research in this area.

Ms. NELSON. Yes.

Mr. WAMPLER. Included in our recommendations—at least on a tentative basis—will be to extend these to agricultural structures for buildings, meaning that we feel like there is great potential to use solar energy in greenhouses——

Ms. NELSON. I think USDA is hopeful that that will happen, as well—parts of the USDA, at any rate.

Mr. WAMPLER. I think it does, quite frankly. And I do not see the time, unless there is some spectacular breakthrough in technology, that solar energy is going to be the major source but certainly it will be a supplemental source and could conserve much of our limited fossil fuels.

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I just wanted you to be aware that we are concerned about this. We hope that when we have completed our work on this conference report that it will have added incentives to try to adapt solar techniques to the production of agricultural commodities. While on the surface it may seem somewhat modest, I think when it is applied intelligently across the Nation, where it can be used it can have a significant contribution in enhancing agricultural production and also in conservation. This, I think, has to be an important part of any intelligent policy.

I wanted you to be aware of that, knowing of your interest as stated in your testimony here this morning. We are looking into that. Hopefully, it will be something we can all be proud of once we complete the work. I hope that will be soon, but I cannot give you any time certain.

Thank you very much.

Mr. DE LA GARZA. Ms. Nelson, let me assure you of one thing. Since having chief jurisdiction over this matter, I would like to reassure you, and I am sure Mr. Wampler would agree, that we certainly intend to continue oversight over this matter periodically.

Let me ask you this. It seems from your testimony that your organization suggests that there should be no private research, but it should also be done publicly by the Government?

Ms. NELSON. No; I do not think that is a fair statement at all. In the past we have had mainly family owned seed men. Most of the research was done in agriculture research centers. Some seed companies have done small amounts of research. What has happened now with a large number of the ones doing research being bought out by large corporations, we have a totally different situation than we had for——

Mr. DE LA GARZA. That is the general business trend. How in this act do we undo that? Should we have the Government take over all research?

Ms. NELSON. I am not saying that. I am just saying that I think that a study or an intensive look at the whole situation needs to be done.

Mr. DE LA GARZA. You made a statement, maybe I did not hear it correctly, but you said that because the large seed companies are now becoming more powerful that they do what is best for the company instead of what is best for the gardener. Having some limited business experience, that is not the way it works. Without the gardener out there, there isn't any company.

Ms. NELSON. I agree with that. But I also look at instances of very large corporations where they do not take the interest of the consumer into effect.

Mr. DE LA GARZA. But that is what they live from. Without a consumer, there is just no corporation out there. It is not *x* company sitting in a bowl out there, Everywhere I go, they cater to the consumer. Major corporate structures have shifted to satisfy one little segment of the consumers.

Ms. NELSON. We would hope that they do. But they do not always do that. They have to look at their profits.

Mr. DE LA GARZA. Yes; everyone looks at profits, but you cannot make the profit unless you have a satisfied customer.

Ms. NELSON. Well, we hope so.

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Mr. DE LA GARZA. I know that. I couldn't tell you I know that from the big companies, and so on, but I know if I don't have satisfied customers out there, I don't come back and sit here.

Ms. NELSON. Chrysler, for instance, does not have customers.

Mr. DE LA GARZA. I asked a question earlier that you expressed some concern. I asked it of Mr. Leese and he assured me of this. Once a little farmer gets hold of some seed, he can reproduce it every year. He can work with it. He can do research. He can do anything he wants to.

Ms. NELSON. The point that I am making in my testimony is that it is up to the seed companies to decide what seeds to offer, and what varieties to offer, whether it is a standard seed or a hybrid seed.

Mr. DE LA GARZA. The farmer can do whatever he wants to with it beyond that.

Ms. NELSON. That is right.

Mr. DE LA GARZA. He can crossbreed, interbreed, and do whatever he feels will make his chilis hotter or thicker.

Ms. NELSON. I am trying to look a few years down the road at things that could conceivably happen. I hope we can examine and avoid them happening.

Mr. DE LA GARZA. That I can assure you we will. I feel that we are on the same track. I do not find too much disagreement with what I think are the intentions behind your organization. I think we agree.

I might find some question with these statements, but maybe I did not interpret them correctly.

We will continue oversight. I would not be involved with this bill if it had control over what the little farmer can do with his little pepper patch and chili patch and tomato patch.

Ms. NELSON. What we would really like to see is some major substantial studies, quantitatively looking at what has happened since 1970 until today.

Mr. DE LA GARZA. I cannot see that anything has happened different with the exception of more people having a backyard garden.

Ms. NELSON. That is a very good thing. But we have found a great consolidation of seed companies.

Mr. DE LA GARZA. Except for antitrust, there is not much we can do. That business world out there is not touched by this act. We cannot do anything about that.

Ms. NELSON. Right, but we can find out if there is a correlation.

Mr. DE LA GARZA. If there is conspiracy to control seed?

Ms. NELSON. No; not a conspircy, a correlation between the act having come in and making small seed men looking to be more profitable for investments by large businesses.

Mr. DE LA GARZA. We had a couple of letters from small seed men endorsing this. You are talking the mom and pop grocery store. It is not their handy corner of the neighborhood anymore. I don't know what we can do about that.

Ms. NELSON. Our organization is for encouraging more small industry in general localities.

Mr. DE LA GARZA. We agree.

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I assure you of one thing. As long as I am here, if then either through interpretation or stretch of the imagination, the Department in any way tries to control or in any way interfere with that little gardener out there doing whatever he wants to with that seed, then you and I will be together there. I assure you of that. If that should ever be attempted, at least this member personally will be the first one to object.

Thank you very much for your testimony, Ms. Nelson.

Is Mr. Jack Doyle present?

I guess he is not. If he comes later, we will pick him up. Otherwise, we will adjust it for the afternoon.

Is Mr. Daniel C. Smith here? I understand that Mr. Smith was not able to be here this morning. He has agreed to exchange his place with Ms. Katharine Anderson, who has a problem in relation to catching a plane this afternoon. Instead of Mr. Smith, we will hear from you, Ms. Anderson, at this time.

We are happy to have you here with us today, Ms. Anderson. Please proceed as you wish.

STATEMENT OF KATHARINE ANDERSON, GARDENS FOR ALL, NATIONAL ASSOCIATION FOR GARDENING

Ms. ANDERSON. Thank you very much, Mr. Chairman.

My name is Katharine Anderson. I am here representing Gardens for All, the National Association for Gardening. We are a nonprofit membership organization which promotes home and community vegetable gardening. One of our responsibilities to our members and other gardeners is monitoring legislation which may affect them.

Our Gallup survey last year indicated that 42 percent of American households have vegetable gardens. We are predicting that, with continued inflation, this number will rise and gardens will increase both in numbers and in size. H.R. 999, the proposed amendment to the Plant Variety Protection Act, concerns six previously excluded vegetables. Four of these, tomatoes, peppers, cucumbers, and carrots, are among the 10 most popular garden crops. That is why we are particularly interested in this bill.

Since last summer we have followed the controversy surrounding this amendment. We have read all available material, and have talked with concerned individuals on both sides of the issue, trying to established our position as the national association for food gardening. This has been a difficult and confusing process, and we have been unable to find answers to some important questions. Therefore, rather than present favorable or unfavorable testimony on this bill, we are here to request more information so that we can assess its potential impact on gardeners.

The first question concerns seed prices. Is there any reason to suspect that patenting legislation may be result in increased prices for home vegetable seeds? Prices have already gone up considerably in recent years and with the expected return to home vegetable production this could bo an important consideration.

Although it is impossible to predict something like this exactly, it would be useful to examine the prices of crops covered in the 1970 Act before and after the legislation was passed. We are not aware of any studies of this type. There are also other countries

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which could be consulted to see what their experience has been with similar legislation.

Again, I realize that there are different situations in different countries, but there ought to be some trend that we could find out about.

The second area of concern is the actual effect of patenting legislation on the numbers and types of vegetable varieties available. One of the purposes of the 1970 Act and of the proposed amendments is to stimulate research on new varieties. We would like to see a comparison of vegetable seeds available to home gardeners in the 10 years preceding the Plant Variety Protection Act and in the 10 years since then. We would also like to know in what ways they differ from one another and from older varieties. Home gardeners, like commercial growers, are concerned with productivity and pest resistance, but they also value nutritional factors and adaptation to local environmental conditions. Before extending patent rights to more vegetables, we need to understand what effects it has already had.

Finally, much has been said about conservation of genetic resources. There is general agreement that this is vital, but general disagreement on whether our activities in this area are adequate to safeguard the future of our major crops.

We have found directly contradictory statements on the connection between patenting laws and preservation of genetic diversity, and we feel it important that this be clarified. Again, a study of the actual effects of the 1970 legislation would seem advisable, as well as a careful look at what has happened in the European countries.

In conclusion, Gardens for All is concerned about this proposed amendment and would like to request additional information on how it will affect home and community gardeners.

Thank you, Mr. Chairman.

Mr. DE LA GARZA. Thank you very much.

Mr. Wampler?

Mr. WAMPLER. Mr. Chairman, I don't know that I have any particular questions. I want to thank Ms. Anderson for coming here and giving us the benefit of her testimony. I might comment, Mr. Chairman, that some years ago, well prior to the time that I came to Congress, it was the practice of the Department of Agriculture to make garden seeds available to Members of Congress to mail out to their constituents. I am not so sure that maybe this would not be a good program to get involved in in this case.

In any event, I think what your organization apparently is attempting to do is to encourage more home gardening. That is to be commended. I feel that particularly during this time of inflation and what appears to be an ever-increasing cost living that home gardening is one effective way for the average American family to help offset the effects of inflation.

I am kind of a flowerpot gardener myself. I do not have time, since I spend most ot the growing season in Washington and not at my home in Virginia, but I do enjoy it very much.

I think, quite apart from the obvious economic aid, there is a great deal to be said for anyone working in field soil and watching things grow.

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I appreciate your testimony. I want to join the chairman in saying that we will continue to watch this very closely, regardless of what happens to the pending legislation, because I think you have raised some legitimate questions that we need to perhaps find better answers and more complete answers for. We appreciate your presence here very much.

Ms. ANDERSON. Thank you very much.

Mr. DE LA GARZA. Thank you very much.

The next witness is Mr. Woodrow Wilson, director of legislative research of the National Farmers Union.

Mr. Wilson, we will be happy to hear from you at this time.

STATEMENT OF M. WOODROW WILSON, DIRECTOR OF LEGISLATIVE RESEARCH, NATIONAL FARMERS UNION

Mr. WILSON. I am M. Woodrow Wilson, director of legislative research, National Farmers Union, 1012 Fourteenth Street, NW., Washington, D.C. Farmers Union is a general farm organization representing over 300,000 farm families. I appreciate this opportunity to present to the subcommittee, our views on the amendments to the Plant Variety Protection Act contained in H.R. 999. Our members are both buyers and producers of certified seed. As such, they have an important stake in this legislation.

The amendments contained in H.R. 999 are primarily technical in nature. The proposed amendments would extend coverage of the Plant Variety Protection Act to six vegetables not currently under the jurisdiction of the act, would change some of the terms and procedures used by the Plant Variety Protection Office and would extend the period of a plant variety certificate from 17 to 18 years. It is our understanding that these amendments have been recommended by the administration to facilitate the participation of the United States in an international convention known as Union for the Protection of New Varieties of Plants or UPOV. The amendments contained in H.R. 999 would strengthen the Plant Variety Protection Act of 1970. The effect of the Plant Variety Protection Act must therefore be examined.

When the Plant Variety Protection Act was proposed 10 years ago, proponents testifying before this subcommittee claimed that the act would stimulate private plant breeding and would permit the publicly funded land-grant colleges and agricultural experiment stations to concentrate their efforts on basic research and areas of applied plant breeding research that private industry would not pursue. The first prediction has proven to be true. Private breeders are now afforded protection of new varieties by certificates similar to patents, and this has proven to be an important incentive to plant-breeding research by private industry. In the past 10 years private companies have certified hundreds of new varieties. Unfortunately, the land-grant colleges and experiment stations have not performed as predicted. Congress Office of Technology Assessment (OTA) reported in October 1979, that the experiment stations have deemphasized their plant breeding research and that this trend is based in part on the assumption that seed companies would do the necessary work. Of the 562 variety certificates issued by the Plant Variety Protection Office by March 1979, only 9 percent were issued to public universities and agricultural

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experiment stations. The movement of plant-breeding research away from public institutions and into private industry has some dangerous side effects.

NEW VARIETIES BEAR INCREASED RISK

The Office of Technology Assessment reports that many of the new varieties certified by major seed companies during the 10 years since the passage of the Plant Variety Protection Act produce higher yields but are more vulnerable to pests and disease. They offer as examples the introduction of new varieties of wheat that have less resistance to Hessian fly infestation and the introduction of corn varieties more susceptible to corn borer. The wheat acreage in Kansas and Nebraska planted to Hessian fly resistant varieties decreased from 66 percent in 1973 to 42 percent in 1977. In 1978, Hessian fly infested over 1.25 million acres of wheat in South Dakota and caused crop losses estimated at $25 to $50 million. The OTA researchers state, "Insect resistance has not been a significant component of commercial breeding programs, and none of the new commercial wheats have resistance to Hessian fly." The introduction of new varieties of corn more vulnerable to corn borer has been partly responsible for the reemergence of this pest, and farmers in the Corn Belt are having to use increased amounts of pesticide to reduce corn borer damage.

The Office of Technology Assessment report goes on to say that the assumption that commercial seed companies could do the necessary plant breeding research while maintaining pest resistance has proven incorrect. The assumption, however, has resulted in a reduction of funding for plant-breeding research by the U.S. Department of Agriculture. Many researchers feel that applied research on pest and disease resistance is less prestigious than basic research, and the widespread use of insect and disease resistant varieties over the past 20 years had lulled many farmers into a falso sense of security about the elimination of many of these risks.

Many pests and diseases that used to cause severe crop losses have not been eradicated. They have merely been controlled, and the use of resistant varieties has been an important seed with less resistance can result in disasters like the epidemic of southern corn leaf blight that destroyed much of the U.S. corn crop in 1970. It was fortunate that the blight problem could be corrected quickly. We may not be so fortunate in the future.

GENETIC RESOURCES THREATENED

Expert witnesses testifying here today have expressed the fear that the granting of exclusive rights to breeders of specific varieties of plants will dangerously narrow the genetic base of our food supply. We do not offer expert testimony on the scientific aspects of this potential hazard, but, if the experts are correct, it is a matter of great concern to farmers and to everyone else.

In 1972, the National Academy of Sciences issued a report on the "Genetic Vulnerability of Major Crops" in which the Academy stated that the seed certification program reduces the genetic diversity of major crops by pursuing uniformity of plant characteristics. Seeds having characteristics that are not of immediate interest

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may be lost, although they may be needed as genetic stock for new varieties in the future. The United Nations Food and Agriculture Organization reports that farmers in some countries have bought new hybrid varieties of seeds and have then destroyed the seeds of their traditional crops by eating them. To prevent such loss the U.S. Department of Agriculture and the government of a few other countries maintain germplasm repositories—seed banks—containing the seeds of primitive and wild varieties of our major crops. These seed banks are vulnerable to many types of hazards. Many experts feel that the seeds now in storage are inadequately protected and that efforts to identify, collect and preserve the seeds of primitive varieties are also inadequate. We cannot predict the hazards that may threaten our crops in the future, therefore it is essential to our food security and to our agricultural economy that we maintain a broad genetic peol from which we can draw in the future.

GROWING MONOPOLY IN SEED INDUSTRY

The seed industry has traditionally been characterized by a large number of small companies serving regional markets. During the past 10 years, however, many seed companies have been acquired by large, multinational conglomerate corporations. According to a report presented to the United Nations Conference on Science and Technology in August 1979, the multinational conglomerates buying seed companies are primarily petrochemical and pharmaceutical corporations. The list of such corporations includes: Upjohn, Monsanto, Sandoz, Ciba-Geigy, Pfizer, Union Carbide, Exxon, and Royal Dutch/Shell. Large corporations acquiring seed companies in the past decade whose primary business is outside the pharmaceutical and chemical areas includes: ITT, Anderson-Clayton Cotton and Cargill.

Almost all of these corporations have other interests in agriculture which may conflict with their seed interests to the detriment of farmers. For example, a corporation selling an insecticide that is effective against corn borer or Hessian fly has little incentive to insure that the new varieties of corn and wheat seed developed by its seed company include characteristics that make the plants resistant to these pests. Mr. P. R. Mooney, author of the 1979 U.N. report, writes that chemical companies are also interested in using seeds as a delivery system for chemicals such as slow release soil fumigants.

Domination of the seed industry by large, multinational conglomerates may leave farmers with few alternative suppliers of one of their most basic inputs. Just four companies, Dekalb, Pioneer, Sandoz and Ciba-Geigy account for approximately two-thirds of all seed sales in the United States for corn, America's biggest crop. Just Dekalb and Pioneer have over half of the corn seed market. These four companies also sell 59 percent of the sorgham seed in the United States.

Along with the acquisitions of seed companies, seed prices have risen rapidly since 1970. All farm production costs have been rising faster than the general rate of inflation during the past decade, and seed costs have been one of the leaders in the price rise. Accordingly the U.S. Department of Agriculture reports of farm production expenditures, the total cost of seeds and plants to U.S.

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farmers rose by 150 percent in just 5 years between 1972 and 1977, and the average cost of seeds and plants per farm increased 164 percent. U.S. farmers now spend over $3 billion per year on seeds and plants. Although the practice varies from one type of seed to another, major seed companies often specialize in certain varieties and concentrate their marketing strategies on a regional basis. This practice reduces effective competition. The growing potential for price manipulation may cost American farmers hundreds of millions of dollars each year.

CONGRESSIONAL STUDY NEEDED

We do not contend that the present and potential problems in the seed industry we have discussed derive solely from the Plant Variety Protection Act. We do believe, however, that the protection afforded plant breeders and seed companies under the act is a contributing factor. We recommend that Congress defer any action on H.R. 999 until the effects of plant variety certification on plant-breeding research, on the environment and on the farm economy are fully investigated. We urge this committee to investigate the adequacy of the current efforts of the U.S. Department of Agriculture in the area of plant-breeding research and the protection of our plant genetic heritage. The Committee on Agriculture in conjunction with the Committee on Foreign Affairs should investigate the ramifications of U.S. ratification of the UPOV convention and should report on the experience of other countries that have patented seed varieties longer than the United States. Too many serious questions remain unanswered for National Farmers Union to support at this time amendments to strengthen a law which may not be serving the interest of American farmers or the American public.

Mr. DE LA GARZA. Thank you, Mr. Wilson.

Mr. Wampler?

Mr. WAMPLER. Let me be sure I understand the position of the National Farmers Union as you have stated it this morning. You do favor increased basic research in plant breeding; is that correct?

Mr. WILSON. Yes, sir, we do.

Mr. WAMPLER. This would be through the additional funding of the land-grant colleges and universities, the experiment stations in the several States, and plus the in-house research being carried on by USDA?

Mr. WILSON. We certainly think it is a dangerous trend for that type of research in the land-grant university system to be reduced and to make the assumption that the seed industry will do that necessary research and protect the interests of farmers and the public.

I think there is a need for both private industry research and public university research. But it is necessary that we maintain a balance between those two.

Mr. WAMPLER. I do not know that I disagree with that statement. I think there has to be a compatible balance.

As you may know, I have just more than a passing interest in what is happening in agricultural research in our country. When you look at the budget trends over the last several years under several administrations, agricultural research is being squeezed in

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the interest of other programs which Congress had determined are of perhaps a higher priority. I should say, I think, in all fairness to our land-grant colleges, universities, and others is that they have limited resources, and they have had to go through this agonizing process of determining highest priorities for their limited research funds. Apparently the decision was made since the private sector was doing extensive research in this area of plant breeding, that they simply were using their limited resources on other areas of research which perhaps had a higher priority, at least from their perspective.

Mr. WILSON. I understand that, Mr. Wampler. I think as you may know the Farmers Union has testified a number of times expressing concern over the priorities that are set by land-grant universities and their research efforts.

Mr. WAMPLER. I am aware of that. I appreciate the position that you traditionally have taken in this regard.

I think that we need to encourage the private sector to carry on as much research as they possibly can. The Secretary of Agriculture has said on more than one occasion that he feels that some of our research dollars are being wasted in the sense that the private sector could be doing this research or the States would do it if the Federal Government was not participating in a partnership arrangement. I do not necessarily agree with that. But it just seems to me that research is something that we must continue to emphasize, keeping in mind that we must use all the resources that we have, both private and public. I think we ought to encourage seed companies to continue their research because I am sure that they have and will continue to bring in a lot of new and innovative ideas and varieties onto the market.

I agree with the chairman. I don't think the profit motive is all that bad; I just don't want to see monopolistic practices in the seed industry as I do not want to see it anywhere else. I think competition is the best regulator—not Federal laws or some Federal bureaucracy.

However, I just wanted to be sure that I understood what the position of the Farmers Union was on cooperative research.

Mr. WILSON. We are certainly in agreement with the sentiments you have just expressed. We would like to provide encouragement to private industry to do research, not only in the seed industry but in a broad range of agricultural technology.

There are some areas where we think that it would be more appropriate for the private industry to be doing research and for less of it to be done in the universities. This is particularly true where we are talking about the development of machinery that is useful only to a very small segment of agriculture and results primarily in the loss of employment. This is, again, an area that we have testified about on a number of occasions.

However, I think that the balance that I was talking about is primarily to prevent domination of research in a particular area that is important to the entire society by the industry that has the most to gain from that research.

Mr. WAMPLER. I thank you. Thank you, Mr. Chairman.

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Mr. DE LA GARZA. Mr. Wilson, so far all the testimony we have heard is against not really this act but that we need to study—that is, not this amendment—but we need to study the act altogether.

This thing has gotten somewhat out of hand in that all the ailments of the farm industry are now attributed to the Plant Variety Protection Act—if it didn't rain; if they had insects and so on.

What has not gone up for the farmer except for what he sells his crop?

Mr. WILSON. Nothing has stayed the same in price except the relative price of farm commodities.

Mr. DE LA GARZA. Is there any way we could research it? Is there anything you could attribute to the act even though it does not deal with these amendments—that is, what percentage of the cost of seed is attributable to the Plant Variety Protection Act?

Mr. WILSON. I am not certain that you can. I have listed only three or four problems that I think are directly related to changes in the seed industry over the past 10 years, and as I have said, I am not testifying that I believe that all of these changes in the seed industry, much less all the changes in agriculture that have taken place over the last decade, are attributable to this act. However, we believe that the act is a contributing factor and that there should be greater study before we take the necessary action to strengthen the act.

Mr. DE LA GARZA. This is really unrelated because you can have or not have an act, and the price is there, and the escalation, apparently from the looks of events, is not going to change. What percentage has the cost of fuel for the farmer increased in the last 5 years?

Mr. WILSON. I am not certain. I have been told that the National Science Foundation is doing research that makes a comparison between the increased cost of fuel and the increased cost of seed over the past decade. I cannot speak to the details of that. I have been told that the price rise in those two elements has been roughly comparable and that the price of seed may have outstripped the increase in price of fuel. I am not certain that is the case. But both have risen very rapidly.

Mr. DE LA GARZA. The price of his tractors and his machinery has increased.

Mr. WILSON. It has gone right through the roof.

Mr. DE LA GARZA. Maybe without having to have a further hearing on it, let's you and I examine it here. What do you think has caused the increase in the price of a tractor from $4,000 to $15,000?

Mr. WILSON. Like so many other things, it has been in a large part the energy costs. It takes a great deal of energy to smelt the ore and do the necessary machining. Every process that goes into building a tractor takes a great deal of energy.

Mr. DE LA GARZA. What else do you think we might attribute to the increased cost of that tractor?

Mr. WILSON. The general rate of inflation—there is any variety of economic factors that contribute to this.

Mr. DE LA GARZA. The cost of labor?

Mr. WILSON. Certainly.

Mr. DE LA GARZA. The cost of plant construction and operation?

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Mr. WILSON. I think all the elements of inflation are involved.

Mr. DE LA GARZA. Some government controls such as OSHA?

Mr. WILSON. Probably.

Mr. DE LA GARZA. There we are. We don't have to have a hearing on that. You and I have worked it out. All we need to do now is get it down to where the farmer can afford it. How can we do that?

Mr. WILSON. Actually, the largest problem facing farmers is finding enough income to pay their bills.

Mr. DE LA GARZA. Right.

Mr. WILSON. It is the reason we have fewer and fewer farmers each year. They keep going bankrupt. We are not going to change that until we raise commodity prices.

Mr. DE LA GARZA. That is part of the problem. If you do not mind my personal intervention here, less and less people are farming; right?

Mr. WILSON. That is correct.

Mr. DE LA GARZA. But yet they are providing for more and more people—that is, as less people are farming, their productivity is increasing and they are providing for more and more people. Is that not right?

Mr. WILSON. Yes, they are feeding more people.

Mr. DE LA GARZA. Part of that is by what is done with the seed, making it better, more productive, more uniform, et cetera.

Mr. WILSON. Unquestionably. And most of those major advances were made on the basis of research done in the 1950's and early 1960's.

Mr. DE LA GARZA. That is why Mr. Wampler and I were so interested in title 14 of the Farm Act—for the research.

I think you mentioned to Mr. Wampler, and we agree that there should be some degree of cooperation between the public and the private interest as far as continuing genetic studies, seed studies, and so on. Was that your testimony?

Mr. WILSON. Yes, I agree with that. We need both private industry and the public sector doing research in this area.

Mr. DE LA GARZA. Without catering to any of these seed companies, there is one very prominent that I would not mention. But talking about what an individual can do, in my area of south Texas you cannot grow apples. We grow oranges, grapefruit, and fruit and vegetables of other kinds. There may be an apple tree here and there, but I always wanted to grow apples. In my place here in Virginia I did not have enough room for apples, but I went and found a catalog from this particular company that has a dwarf apple tree that they worked on and developed. Now I have myself two apple trees that I would not have had had they not done the work for this dwarf apple tree.

To my knowledge, this has been done during the extent of this legislation. So I do not know that it had any effect whatsoever, assuming that it came originally from a seed. I know in the plant now they do inbreeding and crossbreeding.

I don't know if you heard about my little chili patch. But I do some integrated pest management there. I plant tomatoes and chili peppers. I plant garlic in between. The garlic is supposed to keep some of the beetles off the tomato plants.

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I do not know that this act has anything to do with that either. So it does not restrict in any way the ingenuity of the American farmer.

Mr. WILSON. No, sir. It does not.

Mr. DE LA GARZA. Thank you very much. We appreciate your testimony. We share your concerns.

Mr. WILSON. Mr. Chairman, if you enjoy raising apples, I would advise you to come out to California where I am from. My parents have an apple farm out there. I think you would find it not only a pleasant place to live, but a nice place to grow apples.

Mr. DE LA GARZA. I would like to take you up on that sometime. Thank you very much, Mr. Wilson.

Has Mr. Doyle come in yet? We heard that he was on the way. If not, Mr. Donald Dunner will be our next witness.

Mr. Dunner, we welcome you. Please identify your colleague for the record.

You may proceed as you see fit.

STATEMENT OF DONALD R. DUNNER, PRESIDENT, AMERICAN PATENT LAW ASSOCIATION, WASHINGTON, D.C., ACCOMPANIED BY SIDNEY WILLIAMS, CHAIRMAN, PLANT VARIETY COMMITTEE, AMERICAN PATENT LAW ASSOCIATION

Mr. DUNNER. Thank you, Mr. Chairman.

Sitting on my right is Mr. Sidney Williams. He is chairman of the American Patent Law Association's Plant Variety Committee. He is much more knowledgeable on this subject than I. He will help me field any questions you might have.

I appear on behalf of the American Patent Law Association as its president. The American Patent Law Association is a national association of over 4,000 members. We represent large companies and we represent small companies, and we represent plant users. We represent plant producers and growers. In short, we represent a wide diversity of people in the legal community.

We are in favor of H.R. 999. We feel that there have been a number of well-meaning but highly emotional and many erroneous statements against the passage of these amendments. I would like to address my comments not only to the reasons why we support H.R. 999, but to some of the opposition against it.

As you know, Mr. Chairman, there have been two pieces of legislation providing for patent-like protection for plants in the United States. One of those dates back to 1930—the Plant Patent Act of 1930. The other one—the Plant Variety Act of 1970. The latter provides limited exclusive right which gives the plant breeder an opportunity to recoup the investment made in the development of a variety.

Furthermore, by inducing the developer to disclose details about the variety and depositing it in a germplasm preservation center, other plant breeders can experiment with the variety. Without such a system it is submitted by the American Patent Law Association that many of these plant breeders would not disclose the details of their new varieties.

The amendments contained in H.R. 999 would provide protection for six additional identified items of vegetables. These six species were excluded because of the opposition of several of the larger

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food processing companies. The fears of these companies have proven to be unfounded and they no longer oppose plant variety protection for the excluded species.

The amendments will add no additional layer of protection. They will merely extend the protection to the excluded six species that is already afforded to over 350 existing species.

The amendments would also extend the period of protection from 17 to 18 years, clarify some provisions of the law and repeal obsolete requirements of the law.

The International Union for the Protection of New Varieties of Plants—UPOV—suggests an 18-year protection period for woody plants. We are required to change this period to join the UPOV, but such a change would be consistent with UPOV if sometime in the future we provide for protection of woody plants in the United States that are sexually reproduced.

Expected benefits from the Plant Variety Protection Act was spelled out in the legislative history of that act. I will not repeat them here.

By and large, most of these benefits have been fulfilled by the legislation. For example, a 1976 survey established that since the passage of the act in 1970, there has been a substantial increase in the number of private firms conducting research, an increased investment of private research funds in variety development, an increase of research investment as a percentage of sales, and a marked increase in the number of soybeans, cotton, and wheat varieties since the passage of that act.

It is submitted that further fulfillment of these benefits will be aided by adoption of the amendment extending protection to the six species in question.

A number of objections have been made to this legislation. One of them is that the patenting of plants is new and controversial. I think the proponents of this view are confused. There is an ongoing controversy about the patentability of life forms. There is a case on this subject up before the Supreme Court involving micro-organisms. However, plants are not involved in that controversy. Plants have been held to be patentable by act of Congress since 1930, and repeated again in 1970. That is really not an issue.

Another charge that has been made against the act and the amendments to the Plant Variety Protection Act is that such legislation will cause the extinction of varieties and would lead to genetic uniformity. Similar arguments were made of the "sky is falling" type in briefs filed in the micro-organism controversy. These arguments are just that—the "sky is falling" type arguments. They are not entitiled to any serious consideration.

We have pointed out in our statement before this committee that the conclusion that there is a cause-effect relationship between plant variety protection and the extinction of germplasm and genetic uniformity is unsupported by fact. Proponents of that view have failed to distinguish two different types of activities. One type relates to the failure to preserve germplasm. The other relates to decisions not to market or to discontinue marketing because of the failure of a variety to satisfactorily perform in the marketplace. It is necessary for the distinction between those two views to remain. We urge the committee to seriously consider those arguments.

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The opponents of the bill consistently point to two crop disasters as supporting opposition to this protection. The first was the Irish potato famine of 1845 to 1847, and the second was the hybrid corn blight of 1970. Neither hybrid corn nor Irish potatoes are protectable under either of the two existing acts, so neither of those disasters, along with the lack of rain and other calamities can be blamed on plant variety or plant patent protection.

It has also been argued that the Plant Variety Protection Act establishes illegal varieties. We point out that there is nothing in the Plant Variety Protection Act or any of the amendments that would create those illegal varieties. The Plant Variety Protection Act does not serve as a regulatory function. In fact, any fears that that act or a plant variety certificate holder might create shortages in the food supply are totally unfounded.

The act provides specific protection against such action by allowing the Secretary of Agriculture to declare a protected variety open and available to the public to determine if such action is necessary in order to insure an adequate supply of fiber, food or feed in this country and that the owner is unwilling or unable to supply the variety at a price which may reasonably be deemed to be fair.

It is also urges that joining UPOV will require the United States to adopt either the European plant protection laws or a system leading to illegal varieties—that argument hardly deserves extended comment. It is just not accurate.

Opponents of the amendments have also stated that the Plant Variety Protection Act has resulted in a large-scale takeover of American seed companies by foreign-based multinational companies. They further suggest that these takeovers will result in higher seed prices to American farmers, give large seed companies an advantage in the marketplace, and that there is a legitimate reason to suspect, in fact, that chemical companies will link chemical research to varieties that they are developing.

As far as large-scale takeovers by multinationals is concerned, we submit the evidence supports the fact that these takeovers have resulted to the extent they exist at all, from other economic factors such as the decline as the U.S. dollar in the international market and the U.S. tax laws.

As far as higher prices are concerned, it is pure bugaboo that patents give their holders a monoply and automatically permitting them to force up prices artifically. Prices are a product of the marketplace. They are influenced by factors that are economic factors, not merely by the existence of a patent.

It is our position that more research has occurred because people providing the research capital can expect to recoup their expenses and make a reasonable return on their investment. As research expenditures are increased, there will naturally be some increase in the cost of seed. But, as past experience shows, and we have pointed to support for this view, that the cost of protected seed is not that much higher than unprotected seed.

As far as benefiting only large companies, that is just not supported by the record. Plant variety certificates benefit small individuals and small companies as well as large companies. The fact is that in many cases it is an individual or small company ownership of a patent or plant variety certificate that allows them to compete

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with larger companies and it is supported by the record. In fact, only 27 percent of plant variety certificates have been issued to seven of the largest seed companies with the rest going to smaller companies.

As far as the allegation is concerned that chemical companies would deliberately breed seeds that would require the use of chemicals manufactured by that company, we think that view is preposterous. There are many reasons for that.

In closing, Mr. Chairman, I would like to point out that the patent system and our patent laws have served the country and the public very well for close to 200 years.

As everbody knows, however, there has been a marked reduction of innovation in the United States. The result of this reduction is that the President formed a commission to study the patent laws. He had a domestic policy review. He came out with recommendations to try to eliminate the lag in innovation in the United States and in October of 1979 he issued a statement which has led to a bill in the House, introduced by Congressman Kostmayer. There have been other bills introduced to try to improve this innovation lag.

It is our pesition, Mr. Chairman, that honest but misguided attempts to stop amendments of the type being considered now would put a serious damper on the current efforts to try cut short this innovation lag.

For this reason and for the other reasons that I have advanced, we firmly and fervently support the passage of H.R. 999.

Thank you.

Mr. DE LA GARZA. Thank you.

Do you have any comments, Mr. Williams?

Mr. WILLIAMS. I think Mr. Dunner has covered it very well. I would just like to again emphasize that we should keep in mind the distinction between the regulatory type of statute and the plant variety type of statute. They are two separate, different types of legislation.

I would like to emphasize again on the question of genetic uniformity that the act itself actually requires deposition of germplasm so it, in fact, provides incentive to preserve germplasm. I do think that the other concern is a legitimate one, the preservation of germplasm. That is something we have to do whether or not the act exists.

Thank you.

Mr. DE LA GARZA. Do you use the courts to enforce your patents?

Mr. WILLIAMS. Yes.

Mr. DE LA GARZA. Under this legislation, I am sure you have studied the legislation—what are your thoughts on the enforcement part of this legislation?

Mr. WILLIAMS. Mr. Chairman, are you alluding to the ability to discern the differences between——

Mr. DE LA GARZA. The enforcement parts of the Plant Variety Protection Act that we cover under the bill.

Mr. WILLIAMS. My general comment, Mr. Chairman, is that it is very similar to the enforcement provisions of the existing patent statutes which, in fact, give the plant breeder the right to exclude others from using the variety.

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The only difference, I think, is that is a pregrant type of enforceability. That is, on the regular patents that you can only enforce your patent after it is granted. Under this provision here, there is a limited right to prevent others from using seed for reproductive purposes.

Mr. DE LA GARZA. Then, of course, you have the remedy also through civil law, individual versus individual.

Mr. WILLIAMS. Yes. And I think that is the strength of a bill like this. It gives the small company the opportunity to go in and have a court help him enforce this right. Once he establishes that the variety is, in fact, being infringed, then the courts will help him.

Mr. DE LA GARZA. Thank you very much.

Mr. Wampler?

Mr. WAMPLER. Thank you, Mr. Chairman.

Mr. Dunner and Mr. Williams, I want to thank you for your very comprehensive statement. It certainly appears to be a very scholarly piece of work and one that will be very valuable to us as we are considering this subject matter.

Let me ask you this. Legally speaking, a patent is a property right, is it not?

Mr. DUNNER. That is correct.

Mr. WILLIAMS. That is correct.

Mr. WAMPLER. I have been concerned for some years, in this committee especially, as we have tried to address ourselves to various amendments to FIFRA, and now the Plant Variety Protection Act. It seems to me that we have almost rewritten the law of patents here. I felt that a patent was an absolute property right. To the extent that we diminish those rights, we are, I think, rewriting the law of patents. For example, under FIFRA, as you perhaps are aware, an applicant for registration of a product has to supply certain data to justify his registration. I felt for many years that that data should be kept secret, or confidential, and the exclusive use of the person who has filed it.

My question is this. I get the very definite feeling in the field of pesticides that a lot of basic research that could be done and needs to be done is not being done simply because there is no reasonable expectation of exclusive right to that data, or at least it has been diminished by certain amendments to FIFRA. The same problem, I think, applies here in trying to develop new plant varieties if an individual, or corporation, or a partnership or in whatever form they are doing business, is going to have to make a rather substantial commitment of funds from private sources without some reasonable assurance that they are going to get protection, if, in fact, they are able to come up with a new variety that is the subject of a patent.

What effect is this having? Are you in a position to say that any effort to diminish a patent right has a negative eff[redacted] for development of new plant varieties?

Mr. WILLIAMS. I think it does. It is for the [redacted] stated. Obv[redacted] if you cannot expect s[redacted] investr[redacted] is going to be a rel[redacted] money.

I must [redacted] her it be FI[redacted] certainly [redacted] es would [redacted]

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research anyway to determine safety and efficacy. But the effect of diminishing the patents or taking away of subject matter that could be protected by patents will have a chilling effect on research.

I think that we should provide all the incentives that we can to companies and private individuals to invest.

I think that the other problem you alluded to is one that is having an adverse effect on the patent system. This is the effect of the Freedom of Information Act with respect to trade secrets. That is still a question that is being given a lot of thought now, and it is raising, I think, some stumbling blocks to companies and individuals providing information to the governmental agencies that they need simply because they cannot be sure that this information will not be taken up and used freely without any return.

Mr. WAMPLER. I certainly agree with you, as I understand it. If this data is going to be used, there ought to be some reasonable way to compensate the owner of the data for the use of it. But I think he is the person who should have the right to determine whether that data is exclusively his or whether he wants to share it with another person, at least for the life of the patent, at least as I understand it, the protection that has been given him.

This is another question. Of course this subcommittee is now holding hearings on extention of FIFRA, and that is not the subject of the hearings this morning. However, I do think there is a related analogy here between what we have done under the guise of sound public policy and under FIFRA and what could be done here. I am deeply concerned that a lot of domestic producers of certain pesticides are now looking, apparently seriously, to moving their manufacturing operations out of this country to offshore which I certainly don't think is something that this committee wants to see, for whatever reason they are doing it. I appreciate your being here this morning and giving us the advantage of your view because, certainly, I think we would acknowledge that you are experts and authorities in this field.

We need to know what the legal ramifications of any changes to this law might be. Also, that we don't in our desire to recognize the problem do something that would be counterproductive. This is why I would like to see the right of the patent held just as pure as we can so that those that do want to do the basic research can be assured of some reasonable protection and also the opportunity to recoup the tremendous investments that are going to have to be made.

In the field of research I still want to emphasize that I think we are going to have to use every dollar that we can find, both public and private, to try to find better answers or, in this case, better plant varieties, because I am afraid all too often we assume that this high level of productivity that we know in American agriculture is something that just happened. It is not. It is a result of research that has been going on for many, many years.

What is most disturbing to me is that when you look at the projections and what is happening today is the decline in our rate of increase in productivity. We are still increasing our productivity, but not to the extent that we should.

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Again, I think the fact that we enjoy this high level of productivity is because of the basic research and types of plant varieties that we have in this country and ones that we have contributed to in other parts of the world that are adaptable to particular situations that are existing there.

Again, I want to thank you very much for your presence here.

Mr. DUNNER. We are delighted with your views. That is music to our ears as well.

Mr. WAMPLER. I must say that I have been in the minority on this. But I feel it very strongly. I realize there are others who feel there should be changes for perhaps what they perceive as being sound social policy. But to me this is a very fundamental right, and I question whether we in the Congress should be tampering with it. We tend to compound problems rather than solve them when we get in these questionable areas.

Mr. DE LA GARZA. And when we try to solve them, such misinformation is put out that we get into trouble that way.

Let me ask you this, Mr. Williams.

Would you agree with me that this act is an extension—not the amendments—of the patent law into this field? Is that true?

Mr. WILLIAMS. Yes, I would agree to that. There are slight differences procedurally, but the effect is the same.

Mr. DE LA GARZA. It has no semblance, either the act or the legislation, of control?

Mr. WILLIAMS. No, it has not.

Mr. DE LA GARZA. Are you acquainted with the fact, or could you enlighten me if several of the States have licensing laws for seed manufacturers—do they have to your knowledge——

Mr. WILLIAMS. I think what you are alluding to are certain certification agencies. They are voluntary agencies that do exist, but these are not mandatory. They make recommendations but they really cannot tell you whether or not you can market a seed or not.

Mr. DE LA GARZA. When someone has a seed that says guaranteed to be available for planting for 5 years, certified to by *x* certification company. Is that what you are alluding to?

Mr. WILLIAMS. That is right. But again you have to remember that that has no regulatory function in terms of preventing someone from marketing a seed. That is the point.

Mr. DE LA GARZA. That has nothing to do with this legislation?

Mr. WILLIAMS. That has nothing to with the Plant Variety Protection Act.

Mr. DE LA GARZA. Let's say that the State of Texas has a seed manufacturer's licensing process. Do you see anything in this act related to that type of thing?

Mr. WILLIAMS. No, I do not.

Mr. DE LA GARZA. Thank you very much.

We appreciate both of you being here and we appreciate your testimony.

Mr. DUNNER. Thank you very much.

Mr. WILLIAMS. Thank you, Mr. Chairman.

[The prepared statement of Mr. Dunner follows:]

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TESTIMONY BY DONALD R. DUNNER

on behalf of

THE AMERICAN PATENT LAW ASSOCIATION

Mr. Chairman, and other members of the Committee, I am Donald R. Dunner, President of the American Patent Law Association. The American Patent Law Association is headquartered in Washington, D.C. and is a national organization composed of patent, trademark and copyright attorneys. The Association is in favor of the amendments to the Plant Variety Protection Act and would like to offer comments relating to the amendments and opposition statements to them. There have been several well-meaning but highly emotional and erroneous statements relating to the effect that the amendments and the law itself have or will have upon the nation's food supply.

The Association thinks it very important at this time to comment on the amendments because, as everyone knows, we are experiencing a serious lag in innovation in the United States. The Association believes that the Patent, Plant Variety Protection, Copyright and Trademark Laws provide strong incentives for industry to invest in research and development.

I would like to briefly review plant protection legislation in the United States, set forth the Association's position on the benefits of the Plant Variety Protection Act in general and the proposed amendments specifically, and then respond to some of the statements made by opponents of the amendments.

LEGISLATION PROVIDING FOR PLANT PROTECTION IN THE UNITED STATES:

Two pieces of legislation provide patent-like protection for plants in the United States. The first, the Plant Patent Act of 1930,[1] affords protection for asexually reproduced (by cuttings, grafts, etc.) plants except for tuber propagated plants. The second, the Plant Variety Protection Act of 1970,[2] affords protection for sexually reproduced (by seeds) plants other than hybrids, bacteria, fungi and six excluded species.[3]

The Plant Variety Protection Act of 1970 is modeled along the lines of our patent laws. Its purpose is to promote progress in

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agriculture by providing plant breeders with a limited exclusive right on new sexually reproduced plant varieties in exchange for the plant breeders' disclosure of how to reproduce the variety.[4]

The limited exclusive right provides the plant breeder with an opportunity to recoup the investment made in the development of the variety. Furthermore, by disclosing details about the variety and depositing it in a germ plasm preservation center, other plant breeders can experiment with the variety. Without a system providing limited protection for plant breeders and seed companies, it is submitted that many of them would not disclose details of their new varieties.[5]

SPECIFICS OF THE AMENDMENTS:

The amendments contained in HR 999 would provide protection for okra, celery, peppers, tomatoes, carrots and cucumbers under the Plant Variety Protection Act. These six species were excluded because of the opposition by several of the larger food processing companies. The fears of those companies have proven to be unfounded and they no longer oppose plant variety protection for the excluded species.[6] The amendments will add no additional layer of protection. They will merely extend the protection to the excluded species that is already afforded to over 350 species.[7]

The value of these amendments and the Plant Variety Protection Act were best summed up by a noted Botanist, Dr. Gilbert S. Daniels, as follows:

> "Thus the plant patent laws ensure a viable supply of seed and a guarantee of continued availability of genetic resources. No such guarantee or organized storage of unpatented seed exist. The National Seed Storage Laboratory contains many unpatented varieties, but it has to locate such material on its own. So plant patents actually help to preserve old varieties, not lead to their loss...
>
> ...Support of plant patent laws will help in part to guarantee future availability of a portion of our plant gene pool resource and will provide incentives for an ever improving stream of new plant varieties. Personally, I am in favor of continued plant patent laws and the proposed amendments to the Plant Variety Protection Act."[8]

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The amendments also would extend the period of protection from 17 to 18 years, clarify some provisions of the Law and repeal obsolete requirements of the Law. The International Union for the Protection of New Varieties of Plants (UPOV) suggests an eighteen year protection period for woody plants. We are not required to change the period to 18 years to join the UPOV, but such a change would be consistent with UPOV if sometime in the future we provide for protection of woody plants in the United States.[9]

EXPECTED BENEFITS OF PLANT VARIETY PROTECTION HAVE BEEN REALIZED:

Expected benefits from the legislation were spelled out in the legislative history of the Plant Variety Protection Act.[10] They included (1) Stimulation of private plant breeding; (2) Enablement of government agricultural experimental stations to concentrate their efforts on basic research; (3) Allowance for public expenditures for plant breeding in areas that industry might not be willing to pursue; (4) More choice of varieties for farmers; (5) Increased competitiveness of American agricultural products in world markets; and (6) Varieties of improved quality and improved methods of production. By and large, most of these benefits have been fulfilled by the legislation. For example, a 1976 survey established that since the passage of the Act, there has been a substantial increase in the number of private firms conducting research, an increased investment of private research funds in variety development, an increase of research investment as a percentage of sales, and a marked increase in the number of soybeans, cotton and wheat varieties since passage of the Plant Variety Protection Act.[11, 11a] It is submitted that further fulfillment of these benefits will be aided by adoption of the amendment extending protection to okra, celery, peppers, tomatoes, carrots and cucumbers.

PATENTING OF PLANTS IS NOT NEW AND CONTROVERSIAL:

A representative of The National Sharecroppers Fund (NSF) has stated:

> "The idea of patenting new inventions is an old one. Some European nations had had patenting laws several decades before Columbus raised his sails and headed west to America. But the notion that living things could -- or should -- be

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> patentable is new and controversial. In the early 1960's, in order to protect their markets, French rose breeders pressed for laws allowing them to patent their roses. This quickly led to the first comprehensive system of plant patenting." [12]

This statement obviously refers to the controversy surrounding the question of whether a living microorganism is patentable. Arguments regarding this question were recently heard by the United States Supreme Court.[12a] However, the statement is irrelevent to the patenting of plants in the United States. The United States has had a Plant Patent Act since 1930.[13]

Congress concluded as far back as 1930 that plant breeders should be entitled to protection on their newly developed plant varieties, the same as inventors of other inventions were entitled. So contrary to the above statement, plants, with the exception of sexually reproduced plants and tuber-propagated plants, have been protectable in the United States for almost fifty years.

The Plant Patent Act has some limitations. It only offers protection for asexual reproduction of plants, for example by cuttings. Therefore, most of the plant patents issued in the United States are for ornamental varieties. This limitation was partially eliminated by passage of the Plant Variety Protection Act of 1970.

PLANT VARIETY PROTECTION DOES NOT RESULT IN GERM PLASM EXTINCTION AND/OR GENETIC UNIFORMITY:

The most serious charge against the amendments and the Act itself is that such legislation causes extinction of varieties and will lead to genetic uniformity. Opponents of the amendments conclude that the amendments and the law will lead to such genetic uniformity. The American Patent Law Association reaches the opposite conclusion.

The conclusion that there is a cause-effect relationship between plant variety protection and the extinction of germ plasm and genetic uniformity is unsupported by facts or reason. Proponents of the genetic uniformity/germ plasm extinction argument have failed to distinguish two different types of activities: (1) Decisions not to market or to discontinue marketing a variety because of its failure to satisfactorily perform in the marketplace; and (2) Failure to preserve germ plasm.

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The decision not to market or to discontinue to market a variety is based upon its performance and acceptance in the marketplace.

Farmers will purchase and grow out seed that performs best for them under conditions of their particular geographical location.[14] This necessarily will lead to a narrowing of those varieties that are marketed, but it does not follow from this fact that the Plant Variety Protection Act results in the extinction of germ plasm; nor does it follow that the Act does not promote diversification in germ plasm.[15] As a matter of fact, the Act promotes diversity in germ plasm by requiring distinctiveness in varieties.[16, 17]

The failure to market or the removal of a variety from the market does not lead to the extinction of germ plasm but the failure to preserve it does. The Plant Variety Protection Act helps preserve germ plasm because it is mandatory that a sample of any variety protected must be maintained in the Germ Plasm Preservation Center in Fort Collins, Colorado.[18] Failure on the part of the Plant Variety Protection Certificate holder to comply with this part of the law can lead to premature expiration or invalidation of the Certificate.[19]

The preservation of germ plasm is a concern to both the private and public sectors and every effort should be made to try and ensure that preservation is maximized.[20] However, the loss of germ plasm cannot and should not be attributed to the existence of the Plant Variety Protection Act. First, because the Act requires germ plasm preservation of protected varieties. In this regard it should be noted that samples of a variety covered by plant variety protection must be deposited in the Germ Plasm Preservation Center even if it is not being marketed. Secondly, the loss of germ plasm was occurring long before the enactment of plant protection legislation.

In pointing to the dangers of genetic uniformity, the opponents of the Bill point to two crop disasters. The first was the Irish potato famine of 1845 to 1847 and the second was the hybrid corn blight of 1970. Since neither hybrid corn nor Irish potatoes are protectable under either the Plant Variety Protection Act or the Plant Patent Act, neither of those disasters can be blamed upon plant variety or plant patent protection.

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THE PLANT VARIETY PROTECTION ACT DOES NOT ESTABLISH ILLEGAL VARIETIES:

Some opponents of the amendments have stated that adoption of the amendments would lead to illegal varieties. These allegations are probably based upon the fact that in Europe each country has made it illegal to sell certain varieties. The reason that certain varieties have been made illegal is that it has been determined that these varieties will not perform adequately in a specific country. The list of illegal varieties may contain both protected and unprotected varieties.

There is nothing in either the Plant Variety Protection Act or in the amendments that would create so-called "illegal varieties". The United States Plant Variety Protection Act simply does not serve a regulatory function. The United States government does not get into the business of telling farmers what type of seed should be purchased. The United States utilizes a voluntary system of seed certification that "...is operated by independent crop improvement organizations or seed certifying agencies."[21]

Any fears that the Act can be used by a Plant Variety Certificate holder to create shortages in the food supply are unfounded. The Act provides specific protection against such action by allowing the Secretary of Agriculture to declare a protected variety open and available to the public if it is determined that such action "is necessary in order to ensure an adequate supply of fiber, food, or feed in this country and that the owner is unwilling or unable to supply the variety at a price which may reasonably be deemed to be fair."[22]

JOINING UPOV WILL NOT REQUIRE THAT THE UNITED STATES ADOPT EITHER THE EUROPEAN PLANT PROTECTION LAWS OR A SYSTEM LEADING TO ILLEGAL VARIETIES:

The International Union for the Protection of New Varieties of Plants (UPOV) is an organization whose purpose is to (1) help protect both on a national and international basis plant breeders' rights and (2) establish procedures for granting plant variety rights to breeders.[23] The UPOV Convention provides reciprocal treatment. This means that the U.S. would provide a plant breeder from France with the same rights France grants to a United States citizen applying for French plant breeders' rights. The provision of reciprocity is inconsistent with

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the allegation that the United States would have to adopt the European system and its feature of illegal varieties to join UPOV.

It is in the interest of the United States to join UPOV, since it will help enhance protection of varieties developed by United States breeders in other countries that are members of the Convention. The Convention allows American breeders to establish priority rights in member countries if they file their application in those countries within a specified time of filing in the U.S.[24]

Opponents of the amendments have also stated that the Plant Variety Protection Act has resulted in a large scale takeover of American seed companies by foreign-based multinational companies. They further suggest that these takeovers will result in "...higher seed prices to American farmers...give large seed companies an advantage in the marketplace...and that there is a...legitimate reason to suspect that chemical companies will link chemical research to varieties that they are developing...".[25]

With respect to the allegation that the Plant Variety Protection Act has resulted in a large scale takeover by multinational companies, we submit that the takeovers have resulted from other economic factors such as the decline of the U.S. dollar in the international market and U.S. tax laws.[26]

With respect to higher prices, NSF argues that patents give their holders a virtual monopoly and thereby allow them to force up prices artifically. The fact that a company has a large number of patents does not mean that that company controls the market. Prices are influenced by factors in the marketplace and other economic elements. More research has occurred because people providing the research capital can expect to recoup their expenses and make a reasonable return on their investment. As research expenditures are increased there will be an increase in the cost of seed. However, past experience shows that the cost of protected seed is not that much higher than unprotected seed.[27]

It has also been contended that the Plant Variety Protection Act only benefits large companies. This statement simply is not true. Patents and Plant Variety Certificates benefit individuals and small

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companies as well as large companies. The fact is that in many cases it is an individual or small company ownership of a patent or Plant Variety Certificate that allows them to compete with larger companies who have greater resources for marketing varieties. Furthermore, only twenty-seven percent (27%) of Plant Variety Certificates have been issued to seven of the largest seed companies with the rest going to smaller companies.[28]

The allegation that chemical companies would deliberately breed seeds that would require use of chemicals manufactured by that company is preposterous. There are many reasons that pharmaceutical and chemical manufacturers have acquired seed companies. Among these include the natural synergism between seed, chemical and biological research and the fact that the same channels of distribution can be used for agricultural chemicals and seeds. Proponents of the "chemical-seed conspiracy" deliberately overlook the fact that one of the primary goals of any well-run seed research program is to develop varieties exhibiting high disease and insect resistance.

OPPONENTS TO THE AMENDMENTS CONTAINED IN H.R. 999 HAVE RESORTED TO A SKY-IS-FALLING ARGUMENT:

The NSF and other opponents of the Bill have resorted to a "sky-is-falling" argument against the amendments. This argument contemplates that all types of disasters, real and unreal, will result from passage of the amendments. If all beneficial technology involving some controversy or risk was excluded from patent protection the United States public would have been largely deprived of the benefits arising from the use of medicine, petroleum, machinery products, etc. However, any risks due to the use of a particular technology exists independently of patent protection and the folly of excluding such technology from patent protection because of risks was succinctly set forth in an Amicus Brief in the case of Diamond v. Chakrabarty.[29]

It is submitted that the potential calamities alluded to by the opposition are, like those advanced by those opposed to patenting microorganisms, overstated.

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PASSAGE OF H.R. 999 WILL RESULT IN INCREASED INNOVATION IN PLANT BREEDING AND IS IN THE BEST INTERESTS OF THE UNITED STATES:

Our patent laws have served us remarkably well for close to two hundred years. There has, however, been a marked reduction in U.S. innovation over the last decade or so.[30] Major attempts now through various bills introduced by Congressmen and through a bill introduced by President Carter[31] are being made to bolster up the patent system and return the United States the innovative leadership that it once enjoyed. Honest, but misguided attempts to stop amendments of the type being considered now would put a serious damper on the current efforts to improve innovation in the United States. For this reason the American Patent Law Association urges the Subcommittee to vote for passage of the amendments contained in H.R. 999.

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TABLE OF AUTHORITIES

[1] Plant Patent Act of 1930, 35 U.S.C. 161 et seq.

[2] Plant Variety Protection Act of 1970, 7 U.S.C. 2321 et seq.

[3] Plant Variety Protection Act, supra note 2: Section 144 reads as follows:

> "The provisions of this Act shall not apply to the seeds, plants or transplants of okra, celery, peppers, tomatoes, carrots and cucumbers."

[4] Plant Variety Protection Act, supra note 2, preamble:

> "An Act to encourage the development of novel varieties of sexually reproduced plants and to make them available to the public, providing protection available to those who breed, develop, or discover them, and thereby promoting progress in agriculture in the public interest."

[5] Survey conducted by the National Council of Commercial Plant Breeders conducted in 1976.

The results of the survey were summarized by the American Seed Trade Association in 1979 in response to questions raised by Congressman Udall about the effect of the Plant Variety Protection Act. Section I(1)(d) of that summary is as follows:

> "d. The respondents were asked if the availability of plant variety protection had affected their investment in research. Thirteen responded that the availability of protection had no effect on their investment, eighteen indicated a moderate effect, and fourteen indicated a positive effect. In total, 71% of those responding replied that the availability of plant variety protection had had at least some positive effect on their investment in research."

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[6] Response of The American Seed Trade Association to an article by Don Kendall, Associated Press Farm Writer. The article appeared on a syndicated basis on September 7, 1979 (see The Farmers Forum of Fargo, North Dakota).

[7] Proposed Issue Briefing Papers prepared by Bernard M. Leese, Commissioner of the Plant Variety Protection Office - sent to Steve Brattain, Department of State, on January 7, 1980, page 2; Paper entitled "Issues Concerning Amendments to the PVP - Identical Bills S-23 and HR2844."

[8] American Horticulturist, Editorial by Dr. Gilbert S. Daniels, February/March 1980 issue, pp. 3-4.

[9] Background statement on the Plant Variety Protection Act and Proposed Amendment to the Plant Variety Protection Act prepared by the American Seed Trade Association.

[10] House Report No. 91-1605, 91st Congress, 2nd Session (1970).

[11] Survey conducted by the National Council of Commercial Breeders and summary results thereof by the American Seed Trade Association, supra note 5.

Section I(1)(a), I(1)(b), I(1)(e) reads as follows:

"I. 1. The Effect of the 1970 Plant Variety Protection Law on Plant Research - The best 'hard' information was obtained in a 1976 survey conducted by the National Council of Commercial Plant Breeders. The survey represented most of the organizations actively involved in plant variety development in the U.S. The survey was sent to sixty-one private plant breeders with about a 90% response. Some of the results of the survey are as follows:

a. Of twenty-five firms conducting soybean research programs, only one was more than twelve years old. This is strong evidence that the commercial soybean breeding industry is a direct product of the Plant Variety Protection Act. Prior to 1970, breeding of new soybean varieties was conducted

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primarily by state and federal institutions. Plant Variety Protection certificates have been issued on 120 new soybean varieties, which is greatly in excess of new varieties developed during a similar period prior to enactment of the Plant Variety Protection Act. We do not say that all of these 120 new varieties will survive the tests of the marketplace. The important thing however, is that the 1970 Plant Variety Protection legislation has resulted in soybean farmers having a greater choice of new and better varieties.

b. Increased investment of private research funds n variety development since enactment of the PVP Act is indicated by questionnaire results showing that, using 1960 as a base year with a value of 100, investment in research increased in 1965 to 164, 1970 to 232, and 1976 to 712. These figures are strong evidence that the Plant Variety Protection Act has stimulated private investment in research.

c. The survey showed research investment as a percentage of total sales, as follows: 1960 - 2.9%, 1965 - 3.6%, 1969 - 4.4%, and 1976 - 5.3%. These figures are significant because it places the research expenditures of the seed industry at a level exceeded only by that of very research intensive industries and well over that for many industries considered to be research oriented.

e. Enactment of plant variety protection legislation not only increased the number of firms involved in breeding new varieties, but also resulted in those firms with already established breeding programs, primarily

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> hybrid crops, expanding their research programs in include other crops. Of particular importance is that eighteen firms reported that soybeans were added to their breeding programs.

Cotton is another crop in which the value of plant variety protection is evident. There has been a relatively large increase in the number of firms involved in cotton breeding research.

The positive benefits of plant variety protection are evident by looking at the negative aspects as they apply to several of the excluded vegetable species. The American Seed Trade Association maintains a voluntary register of new vegetable varieties. In the case of cucumber, no open pollinated varieties have been listed since May of 1977, whereas, during the same period of time, nine hybrid varieties have been listed. In the case of tomato, five open pollinated varieties have been listed compared to nineteen hybrid varieties. For carrots, no open pollinated varieties are listed with four new hybrid varieties listed, and in the case of pepper, the ratio is two open pollinated varieties and three new hybrid varieties. Hybrids have inherent protection since they do not reproduce completely true from seed after the first generation. The lack of protection for open pollinated varieties of the six excluded vegetables is the direct cause of the direction of research efforts toward development of hybrids. This situation will remain, or even increase, until protection is available for non-hybrid of these species."

[11a] Background statement on the Plant Variety Protection Act and Proposed Amendment to the Plant Variety Protection Act prepared by the American Seed Trade Association, supra note 9, first page, last paragraph.

[12] Hearings on H.R. 999 before the House Agricultural Subcommittee on Department Investigations, Oversight and Research, July 19, 1979 - (Statement of Cary Fowler on behalf of The National Sharecropper Fund).

[12a] Diamond v. Chakrabarty, Supreme Court Docket No. 79-136, heard March 17, 1980. The question involved in this case was whether a living microorganism was patentable subject matter.

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[13] The Patent Act of 1930, Supra Note 1.

[14] Response by the American Seed Trade Association to an article written by Don Kendall, Associated Press Farm Writer, Supra Note 6.

[15] Background Paper by ASTA, supra note 9, page 3.

[16] The Plant Variety Protection Act of 1970, supra note 2.

Section 41(a)(1) requires that a novel variety must be distinct. This section reads as follows:

> "(1) Distinctness in the sense that the variety clearly differs by one or more identifiable morphological, physiological or other characteristics (which may include those evidenced by processing or product characteristics, for example, milling and baking characteristics in the case of wheat) as to which a difference in genealogy may contribute evidence, from all prior varieties of public knowledge at the date of determination within the provisions of section 42."

[17] Background Paper by ASTA, supra note 9, page 3:

> "All plant varieties are characterized by uniqueness. The importance of a variety lies in its being a pool of variations, gene pools, within its expressed characters. This is why it is important to encourage plant breeding by crossing materia now in channels of commerce and with exotic material to increase diversity in our most advanced and diversified germplasm, our commerce varieties. To make a point, it has been determined by statistics that it is possible to obtain approximately 97×10^2 genetically distinct varieties from a cross of two varieties. In summary, the genetic pool of today's varieties is much greater than the genetic diversity of varieties in the past."

[18] The Plant Variety Protection Act of 1970, supra note 2, Section 52(3).

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[19] Plant Variety Protection Act, supra note 2, Section 83(c):

> "The term of plant variety protection shall also expire if the owner fails to comply with regulations, in force at the time of certificating, relating to replenishing seed in a public repository...".

Section 122(b):

> "The following shall be defenses in any action charging infringement and shall be pleaded:...(3) invalidity of the plant variety protection in suit for failure to comply with any requirement of section 52;...".

Section 52 requires an applicant to declare that he will deposit a viable sample of the seed needed to produce the variety in a public depository and that he will replenish the seed periodically.

Also, prior to issuance of a Plant Variety Certificate, the applicant is required to submit a sample of the seed needed to produce the variety to the USDA. Failure to provide the sample within three months of the request will result in the abandonment of the application (See Section 180.101(b), "Regulations and Rules of Practice" under the Plant Variety Protection Act, Chapter I, subchapter H, Part 180).

[20] Samples of all seeds sent to the U.S.D.A. and the Patent and Trademark Office are maintained at the National Germ Plasm Center in Fort Collins, Colorado. In addition, the U.S.D.A. collects wild seeds and has regional centers in seven cities. Seeds are maintained in seven international responsitories and the seed is made freely available to any country and breeder.

J.M. Pochlman, Breeding Field Crops, (2d ed. 1979) at 109-112.

[21] Background Paper prepared by the American Seed Trade Association, supra note 9.

[22] The Plant Variety Protection Act of 1970, Section 44.

[23] UPOV Convention. This Convention was signed by the United States Department of State on October 23, 1978 at the Diplomatic Conference.

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24 UPOV Convention, supra note 23.

25 Hearings on H.R. 999, supra note 12 (Statement of Cary Fowler on behalf of the National Sharecroppers Fund).

26 Response by the American Seed Trade Association to questions submitted by Representative Udall, supra note 9, pp. 7-8.

27 Background Paper prepared by the American Seed Trade Association, supra note 9, pp. 7-8.

28 Citation showing distribution of Plant Variety Protection Certificates.

29 Amicus Curiae Brief on behalf of the Pharmaceutical Manufacturers Association (PMA) n response to arguments advanced in the Amicus Curiae Brief of the Peoples Business Commission (PBC), to the effect that providing patent protection for genetic engineering technology would lead to a multitude of calamities, pp. 15-20.

> "c. The 'sky-is-falling' arguments made against the patenting of living organisms could have been made against a multitude of inanimate technologies which have contributed heavily to this country's progress.
>
> Amicus PBC, and to a lesser extent Petitioner, liberally engage in what has been called 'the doomsday scenar os of 'creative pessimism.'' PBC i concerned with the lack of proven safety of genetic engineering techniques and seeks to impose on the Patent and Trademark Office the obligation to protect the public interest in this regard. However, as will soon be made apparent, controversiality has absolute y noth ng to do with patentability. There are many technologies whose promotion is unquestionably n the public interest notwithstanding the presence of some degree of controversiality or risk in their practice. In 1977, nearly 5,000 peop e in the United States died of poisoning from exposure to chemical substances varying from antibiotics to petroleum products, yet PBC does not suggest that patents should not be granted on these concededly valuable materials. Also in 1977, 1,643 people died in air and space transportation accidents, yet PBC does not suggest that invention in this area

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should be unpatentable. Forty-nine thousand five hundred and ten people died in motor vehicle accidents in 1977, yet innovation in the area of automobile transportation is a high priority in energy conservation. In short, arguments such as those here advanced by Petitioner and PBC predicated upon predicted calamities could have been advanced with equal force to arrest the development of any number of technologies, the overall social and economic value of which are now beyond question.

> Compared to almost any other object which starts with the letter D, DNA is very safe indeed. Far better to worry about daggers, or dynamite, or dogs, or dieldrin or dioxin, or drunken drivers, than to draw up Rube Goldberg schemes on how our laboratory-made DNA will lead to the extinction of the human race.

...Much of PBC's rhetoric is a veiled policy argument that a technology conceded to be capable of widespread beneficial application should, nonetheless, be excluded from the protection of the patent system in vindication of a perceived social or ethical need to regard 'aliveness' with an appropriate degree of awe and respect. A valuable lesson in this regard may be learned from the early experience with organic chemistry in which the very name of the field can be traced to the belief of Berzelius in 1807 that organic compounds could arise only through the operation of some 'vital force' within the living cell. While Berzelius' belief has since been shown to be unfounded, had that belief stood as a bar to patentability of inventions in the area of organic chemistry, the development of that extremely useful art would have been greatly impeded...".

30 S. 1250, the National Technology Innovation Act of 1979 (introductory remarks of Senator Adlai Stevenson of Illinois).

31 H.R. 6933 introduced March 26, 1980 by Representatives Kastenmeier, Rodino and Railsback.

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Mr. DE LA GARZA. Did Mr. Doyle come in? I guess he was not able to make it this morning. We will hear him this afternoon.

That concludes the witnesses for this morning.

The subcommittee will stand in recess until 2 p.m.

[Whereupon at 11:55 a.m. the subcommittee was recessed, to reconvene at 2 p.m. the same day.]

AFTERNOON SESSION

Mr. DE LA GARZA. The subcomittee will be in order.

We will continue the hearing on H.R. 999.

As listed, our first witness this afternoon is Mr. Kenneth Dahlberg of the department of political science, Western Michigan University.

We welcome you, sir. We will be happy to hear from you at this time.

STATEMENT OF KENNETH A. DAHLBERG, ASSOCIATE PROFESSOR OF POLITICAL SCIENCE, WESTERN MICHIGAN UNIVERSITY, KALAMAZOO, MICH.

Mr. DAHLBERG. Thank you, Mr. Chairman.

If I could have my written remarks inserted in the record, then I will try to summarize some of the highlights.

Mr. DE LA GARZA. Without objection, your entire prepared statement will appear in the record.

Mr. DAHLBERG. Thank you, Mr. Chairman.

My name is Kenneth A. Dahlberg. I am a social scientist who has long been concerned with global agricultural trends, as well as their broad policy implications for the industrial and developing countries. I recently had a book published, "Beyond the Green Revolution," which is the result of some 8 years of research and study on global agricultural development.

I am also a member of the International Committee of the Sierra Club and am appearing here today, Earth Day 1980, on behalf of the club.

I thought the dimension that I could add to the committee hearings would be to apply this very long range global perspective to some of the issues. To do that I first examined four major trends that I see developing over the past century. These are as follows:

First, the increasing destruction of forests and the expansion of agriculture into new and increasingly marginal lands.

Second, the shift of population away from the rural to the urban and industrial sectors.

Third, the shift in farming from a vocation based upon renewable and recyclable materials to an energy-intensive enterprise based upon nonrenewable resources.

Fourth, a change in the rural structure from one of numerous decentralized and largely self-sufficient family farms to one of fewer farmers who, whether large or small, depend almost totally upon complex centralized institutions and infrastructures for their inputs, maintenance, and sales.

Each of these trends in my analysis are not sustainable in the longer term, and when combined, I think, present several serious threats to the global ecosphere.

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The one trend that you have perhaps grappled the most with is the question of our energy-intensive fossil fuel based agriculture, and I think there is increasing recognition that while our agriculture is efficient in terms of man-hour productivity, it is extremely inefficient in terms of the energy efficiency.

What I then tried to do was to examine the various risks associated with the above trends and also to look at the kind of standard of judgment that should be applied in evaluating them.

When one looks at the increasing rates at which species are being lost, generally, and to some degree in the agricultural field as well, we find that this is a fundamental threat to the evolutionary potential of mankind. This is not my own opinion alone, it is shared by a very large number of distinguished scientists. In this country there have been several National Academy of Science reports and recently this whole field has been discussed in the "World Conservation Strategy" subtitled "Living Resource Conservation for Sustainable Development."

I would commend this "World Conservation Strategy" to the committee and to other interested people because it represents 3 years of intensive work among some 100 governments and over 700 experts around the world, and a number of international organizations.

The "World Conservation Strategy" was prepared by the International Union for the Conservation of Nature and Natural Resources. It was funded by the United Nations' environmental program, the World Wildlife Fund, and they worked in collaboration with the Food and Agriculture Organization and UNESCO.

So, that is a very broadly based report and they recommend a number of very important shifts in policy both in the industrial and developing countries to try to preserve our genetic endowments.

The argument I would like to make here is that threats to this basic genetic endowment are what I would call a constitutional category of issues. That is to say, in legal theory we require a much more rigorous procedure to amend our basic constitution than we do for ordinary legislation or for administration.

Basically, the underlying idea is that the fabric of society should not be changed on the whim of the moment at the demand of one powerful group or without widespread and full debate of all the implications of the proposed amendment.

In effect, the burden of proof is placed upon those who would alter the basic operating rules of society.

It seems to me that this issue of genetic loss—genetic conservation—is in that category and that the burden of proof should be placed on those who are undertaking actions or proposing legislation which may threaten that basic endowment. Rather than those of us who are concerned having to try to prove that this is a risk, I think it ought to be the other way around, and that the proponent should have to demonstrate clearly that what they are proposing will not lead to any of the kinds of risks that many scientists have identified.

There are a number of risks. I have mentioned the basic genetic question. There is a very large-scale public social-economic issue,

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and this is the question of who has the responsibility for public goods and resources.

In my rough estimates, you might say that the basic genetic endowment of a variety represents perhaps 90 percent of its value. The improvement that thousands of farmers over the centuries have brought to that variety may represent another 9.9 percent of the value of that variety. My question is this. Why should those people adding only the final one-tenth of 1-percent improvement to the variety own it and receive a royalty?

The question then is really the question of whether life forms, and specifically plant varieties should be patented. Here the World Conservation Strategy raises some questions, and I will quote from them here.

In talking about trying to preserve genetic resources, they say as follows:

> Commercial participation should be regarded not as conferring special rights of use but in recognition of shared responsibility. Unfortunately, commercial plant breeders and seed suppliers increasingly are patenting varieties and demanding royalties on their use even though the varieties are as much a product of freely obtained genetic diversity as they are of commercial investment. As a result, many countries may have to pay twice over for genetic material—once for the new variety and once for protecting the material from which it was derived. Plant breeders' rights and the standardization of plant varieties should be so limited that neither has the effect of restricting the free exchange and use of genetic materials or of reducing genetic diversity.

I go on to look a bit at the constitutional language upon which the Patent Office and legislation is based, and suggest that it does not seem to apply to life forms and that, in effect, what the 1930 legislation and the 1970 legislation do is amend the Constitution without going through these complex procedural requirements which I feel should be met for something of that magnitude.

I go on to look at the costs and benefits of the proposed amendments and the original legislation. There are three major benefits that have been identified. They are increase in corporate research and development, description, catalog and storage of the protected varieties, and the facilitation of the United States joining UPOV.

The first of these may well take place and that there will be increased research and development. But the critical question there is what sort of research, in what direction, and for whose benefit?

In my work on the green revolution it is not clear that even many of our public research projects really benefit the large numbers of small farmers around the world.

So, an increase in research is not enough to prove that this is beneficial in and of itself. You have to say what kind of research.

The second benefit, that of describing, cataloging, and storing protected varieties, I think, is clearly there. What I would suggest is that only a very small part of the needs to preserve our plant varieties and germplasm and that a much broader base and fundamental effort is needed than this one very small part of the whole package.

The third benefit relating to UPOV—I am less convinced that this is a benefit in that I have not seen too many fully developed arguments as to why this is a benefit. Certainly the Food and Agriculture Organization is concerned about its relationship in dealing with UPOV. A number of developing countries are getting

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increasingly concerned about the implications of plant patenting and this sort of organization for their own self-reliance and independence in the food sector, and so that to me is a much more open question and should receive much more attention.

My overall conclusion is that there are strong scientific constitutional and practical grounds for rejecting the whole notion of plant patenting or protection. At a minimum, those who are proposing either legislation or actions that threaten our very evolutionary possibilities and options by reducing our common genetic heritage, particularly in this area of plant germplasm, must have the legal and constitutional burden of proof placed upon them.

I have tried to show that the proposed amendments, as well as the basic legislation offers such extremely modest benefits, that is, public benefits. Clearly, there are very large private benefits involved here, but those should be really incidental to what the legislation should accomplish for public purposes. But, the modest public benefits, as compared with the fundamental risks they pose, lead me to the conclusion that the amendments should be withdrawn and that perhaps the original legislation repealed.

Certainly, at a minimum there ought to be a much more in-depth study of the whole range of issues that have emerged so far this morning, and I suspect will continue to emerge this afternoon.

Thank you, Mr. Chairman. I will be happy to answer any questions that you or other members of the committee may have.

Mr. DE LA GARZA. Thank you very much, sir.

Mr. Wampler?

Mr. WAMPLER. I have no questions at this time.

Mr. DE LA GARZA. I have a couple of questions here.

You say that research in and of itself is really not all that important. What kind of basic research do you recommend in the agricultural sector?

Mr. DAHLBERG. I did not say it was not important. I said to judge how important it is you have to look at a whole range of standards. Certainly I think research is critically important. I think there are structural reforms that are needed. Coming from a nonland-grant college, I can say that the funding for agricultural research ought to be expended beyond the land-grant colleges.

Mr. DE LA GARZA. Mr. Wampler and I are trying to help you with the competition grant section of title 14.

Mr. DAHLBERG. I am glad to hear that.

The other dimension relates to a shift from a focus on pure on-field production which has been the focus, I think, of most seed research to a focus on small-scale farm systems. This has been one of the persistent critiques of the consultative group on international agricultural research—that they have continued to look only at the on-field production without looking at what happens to the small peasant in his total small farm system, and that you really need a different kind of innerdisciplinary research than simple seed research. They are moving a little bit in this direction, but slowly and rather painfully.

Mr. DE LA GARZA. I think you have missed the whole boat on this thing, with all due respect, because you are against patenting—period. That is something we are not directly addressing here.

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No. 1, as far as I am concerned, the major thrust in the seed business is really not the commercial aspect as far as the farmer is concerned, but about that individual peasant that you talk about. There is more research being done now on seed that can be utilized by the home gardener. The thrust is to go to the fellow that can grow tomatoes on a balcony in New York City, and in the backyard in a townhouse in Washington. In my investigation and perusal of the situation I see something different than you are concerned with.

Mr. DAHLBERG. I was talking primarily about the Third World situation.

Mr. DE LA GARZA. The Third World situation—again, that kind of waves a flag at me because what Third World country—you name one—is where the individual peasant with his individual plot of land is going to be planting okra?

Mr. DAHLBERG. You were asking me about what direction research ought to move into. I simply said that I felt research should move away from a focus on seed research to a focus much more on small farm system research and the kind of appropriate technologies and institutions that will enable the small peasant to become more self-sufficient.

Mr. DE LA GARZA. Right. But you cannot separate it. The process begins when you break the land. The second step is planting the seed. Before you plant the seed, you have got to do all that research. The seed does not come from little birds flying up in the air.

Mr. DAHLBERG. No, but one concrete example that I give in the written testimony is that in the 1930's the Mexican seed scientists were stressing the need for improved varieties where the peasant could grow his own seed corn as part of his normal dry-land focus.

When the Rockefeller Foundation did their work, they shifted both to hybrids and to an emphasis on irrigated farming, so they moved away from a real concern with the small dry-land peasant.

Mr. DE LA GARZA. No, they did not, because you have this short wheat for dry land which was utilized in India-Pakistan. Mexico was the developer of the dwarf short wheat.

Mr. DAHLBERG. I was talking about corn in this case. There are differences between crops.

Mr. DE LA GARZA. You also have the corn that was developed in Indiana which can be utilized more for people who have only the corn as a single substance for food.

Mr. DAHLBERG. The studies I have seen and the Rockefeller Foundation did a project called the Pueblo project, and they found that their hybrids of corn did not function any better significantly on dry-land conditions than the local improved varieties, and that what you needed to improve production was the whole range of other measures. That was in the 1960's when they got around to that. The point is, it took them 20 years to develop a very widespread concern for the agricultural problems of the small peasant.

Mr. DE LA GARZA. The small peasant who saves his seed from year to year winds up with no crop at about the seventh year.

Mr. DAHLBERG. I am just simply saying that we need more research on how to help that small peasant, but that it takes much

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more than just a focus on seeds. That is the only point I make there.

Mr. DE LA GARZA. Basically, I don't think we disagree. Basically I think we are aiming at the same thing. The problem here is that this is a simple bill.

Mr. DAHLBERG. My question is about this. I really think the burden of proof should be shifted because in my view it reinforces all of these trends which are not sustainable in the long run. The committee should say that they got along 200 years without plant patenting and why do they need it now other than for commercial benefit of a relatively small number. There may be small companies involved too.

Mr. DE LA GARZA. That may very well be true, but I don't want to go back to 200 years ago.

Mr. DAHLBERG. But we managed up until 1970 without patenting sexually reproduceable plants. Yet we have no serious study on what has happened since 1970.

Mr. DE LA GARZA. Somebody has put out the word that there have been no serious studies. That is what we are doing, and everybody says there is no study, and there must be more study, when they do not have any specifics.

What do you see basically wrong with an individual be he a little grower in South Texas or in California, or Arizona, Mexico, Michigan, or Arizona developing a seed for a miracle tomato? What do you see wrong with him going over and saying that he wants to patent the seed?

This is just an individual—no conglomerate. This is just one man out there. He developed the seed from his own research and says he wants to patent it so he can sell it.

Mr. DAHLBERG. I think the objection is kind of an institutional objection. Once you set up an institutional system for patenting and protecting through the courts and through registration and so on, you then in the long-run are going to discourage the small farmer from doing this. You may have an initial movement of public researchers moving into the private sector. But it is a question of balancing the public need versus private research. I have nothing against private research. It seems to me that the seed companies managed quite well up through 1979 in marketing and working with their varities without patent protection. It seems to me this is primarily a way of increasing protection for them.

Mr. DE LA GARZA. It becomes a property right if somebody develops something.

Mr. DAHLBERG. I am not sure. My argument is that throughout history this has been a common good, and that to suddenly say that this is a private property right is a constitutional amendment. We ought to discuss it in these very wide-ranging terms. What does this really mean in the long run—not only for plants but for other life form.

Mr. DE LA GARZA. You have a very interesting contribution, Mr. Dahlberg, and we appreciate it. I feel somewhat affronted that everyone comes up and says that we need more serious investigation of this problem, and this is why we are having these hearings. We could have marked up this bill after the first hearing when the witnesses were, I think, 11 for and 2 against, and one that could

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have gone either way, but in order to hear everyone and provide more imput, we have come back here.

Certainly your presentation and philosophical discussion of this issue will be considered.

We thank you very much.

Mr. DAHLBERG. Thank you very much, Mr. Chairman.

[The prepared statement of Mr. Dahlberg follows:]

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KENNETH A. DAHLBERG
ASSOCIATE PROFESSOR OF POLITICAL SCIENCE
WESTERN MICHIGAN UNIVERSITY

My name is Kenneth A. Dahlberg. I am a social scientist who has long been concerned with global agricultural trends, as well as their broad policy implications for the industrial and developing countries. I am also a member of the International Committee of the Sierra Club and am appearing here today Earth Day 1980, on behalf of the Club

Mr. Chairman and members of the subcommittee am pleased to have this opportunity to discuss with you some of the broader issues that are raised by the proposed amendment to the Plant Variety Protection Act, as well as by the Act itself To appreciate most fully the importance of the issues it is necessary to see them in the context of the broad trends of the past century and to examine the serious risks associated with them. I then intend to show that the amendments (as well as the original Act) increase these risks well beyond the point of any compensating benefits.

TRENDS OF THE PAST CENTURY

When one looks at agriculture over the past century from a global perspective, four fundamental shifts or transformations are apparent. These are 1) the increasing destruction of forests and the expansion of agriculture into new, and now increasingly marginal, lands 2) the shift of populations from the rural to the urban and industrial sectors; 3) the shift in farming from a vocation based upon renewable and recyclable materials to an energy-intensive enterprise based upon nonrenewable resources; and 4) a change in rural tructure from one of numerous decentralized and largely self-sufficient family farms to one of fewer farmers who, whether large or small, depend almost totally upon complex centralized infrastructures and institutions for their inputs maintenance and sales This has been the general pattern among the industrial countries (with obvious individual variations It also threatens to become more and more the pattern among the developing countries as industrial agriculture better known as the "green revolution is adopted and promoted by the elites of these countries. I used the term "threatens" because it is my carefully considered conclusion that each of these trends has reached and most likely exceeded its sustainable limits and that further movement in these directions severely threatens both the countries involved and the global ecosphere. I am no alone in this view, as I shall show when I discuss each of these trends in somewhat greater detail.

1. The destruction of forests and the expansion of agricultural land. While the expansion of agricultural land is only one of several causes for the loss of forests, the loss -- especially of tropical forests -- has become so serious that various national and international task forces have been set up and have made reports. Both the U.S. Strategy Conference on Tropical Deforestation and the recently released World Conservation Strategy stress the need for major new initiatives to preserve the world's forests and to try to encourage reforestation.

2. Population shifts from rural to urban areas. While the industrial countries had the luxury of having their shift occur over a period of more than a century, the developing countries have been suffering from the double pressures of rapid population growth and dramatic migrations of people to the urban areas, where they are often crowded into miserable slums. Virtually all development analysts agree that every

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effort should be made to slow this rush of people to the cities. The best way to do this would appear to to improve the life of peasants in the rural areas through development programs which enable them to meet more of their own needs, rather than displacing them through the introduction of capital- and energy-intensive modes of agriculture In the U.S there has been some movement of people back to the rural areas, and this can be expected to increase as energy price increases with their multiplier effects, funnel through our energy-inefficient food system.[2]

3. Energy-intensive, fossil fuel agriculture. The demands of industrial food systems for huge amounts of nonrenewable energy have led many thoughtful observers to conclude that our present system is not sustainable even at current population levels, much less at those projected for the year 2000. As the Pimentels point out

> "Another way to explore the dependency of food production on fossil energy expenditure is to calculate how long it would take to deplete the known world reserve of petroleum if a high protein/calorie diet, produced using U.S. agricultural technologies, were fed to the entire world population. . . Assuming petroleum were the only source of energy for food production, and all known petroleum reserves were used solely for food production, the reserve would last a mere years."[3]

Clearly, the present U.S. system cannot be used as a model, even for future U.S. food production. The movement toward new systems that are based on renewable resources and have lower energy requirements will be difficult but necessary if we are to avoid some sort of major collapse in the longer term. In implicit recognition of this, the USDA has recently sponsored studies on organic farming methods to examine and evaluate their greater use of renewable energy resources. Another major area where changes can be made is in the high protein/calorie diet of most Americans — a diet that is increasingly recognized as unhealthy.[4]

4. Changes in rural structure. The trend toward more large farms producing large crops which are then fed into a complex and centralized processing, packaging and distribution system is the source not only of many of the energy inefficiencies described above, but also the source of frustrations for both farmers and consumers over their inability to influence more than slightly what happens to their livelihood and/or staff of life. Like the monocultures which are increasingly grown there, the whole rural structure is being simplified and thus becoming subject to wide swings and pressures from external events such as oil embargos, grain embargos, market controls climate shifts etc. Equally such simplified systems require a high degree of supervision maintenance and intervention from the outside -- something that the members of this committee must be well aware of. Again, the USDA has egun to explore some of the ramifications of changes in rural structure, but in much more narrowly defined terms.

RISKS ASSOCIATED WITH THE ABOVE TRENDS

As suggested above, each of the trends of the past century is not only unsustainable but has various serious risks associated with it. In addition, when taken together these trends carry with them fundamental risks to the global ecosystem and to the evolution and availability of plant species upon which humankind depends. In dealing with future risks it is important to be able to sort out broader, more fundamental risks from narrower and less basic risks. As I have argued elsewhere:

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"To make intelligent policy for the future, we must first ascertain those broad evolutionary limitations, parameters and goals to which we must be sensitive if we are to survive as a species; next, we must examine the limitations and parameters facing us in the next century and we must establish our goals for this long period, keeping in mind that these goals must be consistent with evolutionary limitations and goals. Only then can we turn to specific policy recommendations for the relative short term of the coming decade."[5]

There is general scientific support for the idea that the earth's genetic resources must be husbanded at all costs and that the increasing rate of loss of species is a fundamental evolutionary threat to humankind. In this sense all other programs and priorities must yield in the face of a conflict between them and genetic conservation. If this applies as a generalization for all species, it must be even more the case for the plant and animal species upon which we directly depend.

Perhaps a few analogies will help to clarify the argument. One draws upon the distinctions made in law between the procedural requirements for amending the Constitution, those for legislation and those in administration. The procedures required to amend the Constitution are complex and demanding, the underlying idea being that the basic fabric of society should not be changed on the whim of the moment, at the demand of one powerful group or without widespread and full debate of all the implications of the proposed amendment In effect, the burden of proof is placed upon those who would alter the basic operating rules of society. In this sense actions which threaten to reduce or alter the basic genetic fabric and endowment of the ecosphere should be required to meet the equivalent of the constitutional test that is the proposed action, whether legislative or administrative public or private should have to be discussed widely, should be subject to stringent procedural requirements and safeguards and should have to demonstrate clearly that the proposed changes are required and that any potential risks of genetic simplification can be fully overcome. In this sense, the Plant Variety Protection Act of 1970 passed in the rush to adjourn for the Christmas recess -- cannot be said to have passed the "constitutional" test to which it should have been submitted.

A second analogy may help to show how our evolutionary options are reduced through the simplification of basic systems. In the 1920's and 30' the electric trolley systems in many cities were bought out by large automobile companies and eventually replaced by buses. Simultaneously, the number of automobile companies was reduced, as several large firms came to dominate the industry The result has been a transportation system which is heavily weighted in favor of large private corporations and against the revitalization of public mass transit systems. This is a fair analogy for what is likely to happen as large companies take over a number of seed companies the number of options available to the smaller and poorer farmer will be reduced as prices go up on a smaller range of products designed primarily for larger and wealthier customers To make a complete analogy however one would have to include the basic difference between biological and mechanical systems i. if the transportation system operated as a biological one then there would be no chance today to revitalize trolleys or other surface rail mass transit systems -- the species would have become extinct. And all the king's horses and all the king's men . . . .

The above discussion suggests another basic risk associated with current trends, one which, if not fundamental in the evolutionary sense, is certainly basic to our democracy.

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It is the question of who has ultimate responsibility for public goods and resources. If current trends continue there will be not only an increasing take-over of publicly available plant genetic resources by large private interests but the ironic situation where basic varieties cultivated and improved by numerous generations of peasants in developing countries are "fine tuned or crossed with other such varieties, patented, and then sold as a "new and different" variety in the countries of origin If the basic genetic endowment represents 90% of the value of the variety, the improvement over the centuries 9.9%, then why should only those adding a final .1% improvement to the variety "own" it and receive a royalty?

Both scientific logic and an examination of history indicate that plant and animal species, deriving as they do from wild species, must be considered as primarily a public or common good. As the World Conservation Strategy states: "As the basis of continuing evolution, wild gene pools are the common heritage of mankind. They therefore need an international cross-sectoral programme for their protection on site."[6] In terms of crops, the International Board for Plant Genetic Resources (IBPGR) has identified ten high priority regions for the collection and preservation of crop genetic resources in several on-site protection is suggested for both crops and their wild relatives which are often a major source of pest and disease resistance as well as other important adaptations The World Conservation Strategy also notes:

> "The assistance provided by the IBPGR in the case of crop genetic resources is a start in this direction; but all types of genetic resources should be covered, and contributions should come not only from governments and international organizations but also from the commercial enterprises which benefit directly from living resources. Commercial participation should be regarded not as conferring special rights of use but in recognition of shared responsibility. Unfortunately, commercial plant breeders and seed suppliers increasingly are patenting varieties and demanding royalties on their use even though the varieties are as much products of freely obtained genetic diversity as they are of commercial investment As a result, many countries may have to pay twice over for genetic material once for the new variety and once for protecting the material from which it is derived. Plant breeders' rights and the standardization of plant varieties should be so limited that neither has the effect of restricting the free exchange and use of genetic materials or of reducing genetic diversity."[7]

The above is also consistent with the broad Constitutional language under which patents are issued: "To promote the Progress of Science and the useful Arts by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries" (Article I, Section 8) The language clearly indicates that patents or their equivalents are simply a means toward progress in science and the useful arts. The latter are associated with mechanical products by the use of the terms "inventors" and "discoveries" To seek to apply the language to biological systems would seem to require a Constitutional amendment -- precisely the point made earlier in slightly different form. It also clearly indicates that any patenting system has to be measured against the progress it promotes and that Congress has the right to limit abuses by limiting the time given to authors or inventors to exercise an exclusive right over their writings or discoveries The proposed amendments to the Plant Variety Protection Act offer the occasion to begin a serious review of whether the novel idea of patenting plants and other life forms is consistent with the Constitution or requires a Constitutional amendment. Also, it certainly provides the occasion to start making a more

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consistent and comprehensive evaluation of the real and potential costs and benefits of both the proposed amendments and the original Plant Variety Protection Act.

COSTS AND BENEFITS OF THE PROPOSED AMENDMENTS AND THE ORIGINAL LEGISLATION

In discussing the costs and benefits of the proposed amendments and of the original legislation, I will focus primarily upon the broader and longer-term aspects. This is because the shorter-term dimensions will receive more discussion and because they must really be seen and understood in terms of the more basic concerns outlined above. Let us turn first to possible long-term benefits flowing from this legislation. While there are a large number of financial benefits to the corporations involved -- and this would appear to be their major reason for supporting such legislation -- this should not be a reason for Congress to support it. Any financial benefits should be incidental to a significant gain in public benefits over public and private losses. Leaving aside then the large financial benefits to private corporations, what other possible long-term benefits can be suggested? There appear to be three: 1) an increase in corporate research and development, leading to more varieties; 2) the description, cataloguing and storage of the protected varieties in the National Seed Storage Laboratory; and 3) the facilitation of the United States' joining UPOV, the International Union for the Protection of New Varieties.

While a plausible argument can be made that seed variety R & D will increase as corporations are assured that they will be more likely to receive a return on their investments in R & D, the evidence so far is not clear in one direction or the other. Even if there should be an increase in corporate R & D, this cannot in itself be judged beneficial. One has to ask both about the direction of the research and whether the increase in corporate R & D is at the expense of publicly supported research on seed varieties. These are vital questions, because corporate research tends to be on low-risk, commercial viable strains, i.e. those varieties that will have the widest application and will fit in with the other marketing strategies of the parent company.[8] The qualities that tend to be stressed are the appearance of the plant, fruit or vegetable; the yield or size; the uniformity of the crop; and how easily it can be harvested and processed. Such an emphasis neglects several important factors. First, the question of the quality of the plant in terms of pest, frost or drought resistance tends to be neglected. Next, the nutritional quality and taste of the product tends to be ignored. Finally, the need to tailor the varieties to the requirements of particular regions also tends to be neglected. This last point is one of great concern to Canadians, who are afraid that plant patenting legislation will both weaken their publicly financed seed research and consequently reduce the number of varieties developed specifically for wide-range growing conditions.[9]

The failure to recognize the need to tailor varieties to the needs of <u>both</u> the local environment <u>and</u> the majority of small farmers or peasants can be seen s one of the major failures of the Green Revolution -- one directly traceable to a shift in research emphasis. The work of the Rockefeller Foundation and Norman Borlaug in Mexico did seek to adapt hybrids to non-temperate zone conditions, but it failed to recognize something that Mexican seed researchers stressed: that what was needed in Mexico was research on maize, beans and vegetables for the dryland regions, research using improved varieties rather than hybrids so that the peasant could grow his own seeds along with his crops.[10] It took the international research centers over twenty years to recognize the need to develop seeds specifically for small dryland peasants; even so, the research still tends to emphasize plant breeding rather than research on improving the welfare and

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productivity of small farm systems. This digression leads to an important point: that talk of plant patenting having something to do with solving the problems of world hunger is largely rhetorical. The real problems of world hunger are complex and go far beyond seed patenting, although many observers are increasingly arguing that it will make the problem more serious by increasing the market control of the multinationals in the developing countries

The second possible benefit, that of describing, cataloguing and storing the protected varieties is one that clearly flows from the legislation While this is a benefit, it must be weighed against the losses of non-protected traditional varieties which result from a system which is based increasingly upon the mass marketing of a relatively narrow range of varieties controlled by a few large corporations[11] The matter reaches well beyond this. One must ask how much these losses reinforce the trend toward an increasingly simplified and unstable agricultural system and rural structure something that obviously derives from a wide range of government and corporate policies, questionable economic assumptions and technological developments.

The third possible benefit that the amendments will facilitate the U.S. joining UPOV, assumes that U.S. membership is a benefit. Certainly, membership will benefit the large seed companies by including them in an international system which is clearly structured to their advantage; whether membership will provide benefits to either the farmer or the public is doubtful, for reasons which will be discussed below. Again, the question arises whether Congress should pass legislation simply because it will be advantageous to certain commercial interests.

Let us now turn to the long-term risks and costs which may flow from this legislation. These should be understood as involving three levels First, there are the evolutionary risks described above the risk of losing irreplaceable plant genetic materials and the risk of simplifying and/or destroying the reservoirs of all manner of germ plasm to the point where both agriculture and life itself is threatened. As has been stressed, the seriousness of this threat requires that proponents of plant patenting have the burden of proof placed on them to show that such patenting will in no way contribute to or reinforce the trends which so threaten us.

A second level involves those long-term risks associated with the social, economic and political implications of the four broad trends identified earlier. It would appear that these amendments and the legislation itself tend to reinforce these unsustainable trends By reinforcing these trends, rather than moderating or starting to reverse them, such legislation increases the risk of some sort of drastic collapse or disruption. At this level, it is also clear that the modest public benefits (as distinct from the large private benefits) do not come close to counterbalancing the very large public and private risks involved in reinforcing the four trends.

A third and more modest level involves a consideration of what experience from other regions, as well as other sectors, suggests about a patent system as applied to plants. The experience in Europe is certainly not encouraging. Their plant patenting system is set in the larger framework of the Common Agricultural Policy a bureaucratic nightmare that richly rewards large producers at the expense of small farmers and the consumer. The cost of the CAP is so high that Britain is currently seeking to renegotiate the whole of its budgetary commitment to the EEC. Within this complex, large-producer-oriented system, the so-called "Common Catalogue" has been developed. Based upon "national lists" prepared by each EEC member, it has generated much

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discussion because of its so-called "illegal vegetable" aspect. That is, after June 30 1980, it will ecome punishable to sell vegetable varieties not on the list. The fine in Britain will be up to £400. What is less discussed is what it takes to get a variety on the list and keep it there. In the U.K. an unlisted variety must undergo lengthy tests at a cost of roughly £1000 Once on the lis , there are annual fees of £70 for registration and £300 for inspection. Clearly, such provisions discriminate against both the small seed company and the small farmer or gardener. Similarly, the $750 administrative fee required for protection under the Plant Variety Protection Act discriminates against the small breeder and seed company. Even more serious are the consequences for the loss of genetic diversity. Erna Bennett a Genetic Conservationist at the FAO, has stated:

> "It is completely unavoidable that the application of such a policy as is embodied in the EEC Common Catalogue results in considerable genetic impoverishment. is also inevitable that it results in poorer and less nutritious vegetables, even if they may acquire in the process certain aesthetic elegance It is my view that this is a gross distortion of plant breeding and agricultural objectives. It is also a dangerous policy. We can expect a loss of three-quarters of the genetic diversity of Europe s vegetables within a decade. Prediction is always uncertain but let us remember that even without the EEC Common Catalogue, the last 30 years have seen an equal amount of genetic loss or even greater in some species of vegetables Now, with legislative force to aid the process, it would be foolish to hope for anything less catastrophic."[12]

The distinguished British agriculturalist, Sir Joseph Hutchinson, has concluded that "In the interest of economic advance we have established varietal rights legislation, and in the EEC we are engaged in making sure that none but the most advanced varieties are allowed to be sold in the area, thereby very greatly restricting the diversity that is available to us. We are in fact selling our birthright for a mess of pottage [13]

Two conclusions should be drawn from the above. One, that while the Common Catalogue may be a rather crude and abusive system it follows logically from an agricultural system dominated by the commercial priorities of large producers and firms and the bureaucratic convenience of the Eurocrats in Brussels. Two, that the U should be very cautious about joining an organization the International Union for the Protection of New Varieties (UPOV) -- that is dominated by these same European groups. No need for the U oin has been advanced other than bureaucratic convenience for USDA or commercial advantage for large seed companies. Food and Agriculture Organization (FAO) officials have expressed extreme caution about their relationship to UPOV citing the ways in which UPOV restricts the free flow of genetic information and germ plasm and the grave risks for the developing countries resulting from the monopolistic practices which tend to flow from UPOV's protection of new plant varieties. In addition, UPOV's role in encouraging the patenting of other life forms needs to be closely examined

Before concluding, I would like to point to the experience we have in a parallel industry where restrictive legislation, corporate concentration, heavy advertising and similar research questions arise -- the pharmaceutical industry (which, not incidentally, is one of the major industrial sectors buying up independent seed companies). While there are obvious differences between different pharmaceutical

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Mr. DE LA GARZA. Ms. Maureen Hinkle is our next witness. We welcome you once again to this committee. It is nice to have you here, and we will be happy to hear from you at this time. Please proceed as you wish.

STATEMENT OF MAUREEN K. HINKLE, ENVIRONMENTAL DEFENSE FUND, WASHINGTON, D.C.

Ms. HINKLE. Thank you, Mr. Chairman.

I have a long statement which I hope will be entered into the record.

Mr. DE LA GARZA. Without objection, your full statement will appear in the record and you may summarize your testimony.

Ms. HINKLE. We appreciate this opportunity to testify before the House Agriculture Committee on the Plant Variety Protection Act.

The past decade of monitoring pesticide problems has brought to EDF an appreciation of many related factors involved in the task of producing and protecting our food supply.

We welcome this opportunity to go on record as favoring congressional focus on genetic plant resources and germplasm programs. We urge high priority for this vital issue which deserves thorough and comprehensive hearings, with testimony from a broad range of interested scientists. The views of officials and scientists in other countries should also be sought before action by Congress on this basically international issue.

We hope, therefore, that the record will remain open for such testimony as may be forthcoming.

In our view, H.R. 999 amendments are framed narrowly, but they in fact have far-reaching consequences. We suggest that the impact of the 1970 law needs to be ascertained before broadened to include additional food crops. After our review of the legislative history of the 1930 law, hearings on patent law revision in 1968, and the 1970 law, we respectfully oppose H.R. 999 on the following grounds.

We believe the PVPA contributes to scientific and legal problems on plant variety restriction to which H.R. 999 would only add. We accordingly have gone through the legislative history of how plant patents were extended to living organisms in 1930 and how that patent right was extended beyond the Patent Office and given to the USDA, basically as a registration authority.

This is a controversy among international experts and scientists on whether plant patent legislation inhibits free exchange and access to information on germplasm.

We are also concerned with policy implications of this legislation. Of concern to us are genetic uniformity, genetic vulnerability, and genetic suffocation or the disappearance of traditional varieties.

As mankind has been plagued by pests since ancient times, epidemics have had and will continue to have devastating effects on crop production and thus on the stability of human society.

Genetic vulnerability has been a major aspect of such episodes. If patenting of seeds accentuates genetic uniformity, we should know what part this protection plays and how to encourage genetic diversity.

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tion, "Industry cannot replace the public agencies as vehicles to solve the high risk projects that need to be undertaken in breeding if we are to progress."

In regard to uniformity, Dr. Sprague testified on aspects that produce genetic uniformity. Section 41(a)(2) of the PVPA requires uniformity in the sense that any variations are describable, predictable, and commercially acceptable.

The need for high level uniformity in vegetable crops plus dependence on breeding for disease resistance render the vegetable industries in the United States vulnerable to disease epidemic as the genes for this uniformity happen also to make the crop more susceptible to a disease and an epidemic is in the making.

When uniform crops exist over large areas the situation is ripe for epidemics.

The talent is, therefore, for breeders to provide diversity. As the National Academy panel put it in 1972, "breeders must build redundancy into a backup system." In addition, they must search for new genes, and develop gene pools to preserve those they have.

Diversity is the key, we believe. In business and finance diversification hedges against high risk. Diversity also aids the ability in the biological world, and is the best insurance against epidemics.

In regard to the role of germplasm diversity in meeting the need to produce food for the growing world, the 1978 National Academy stated:

> In cultivated crops germplasm resources are required to provide the genetic diversity needed to ensure future production.

In addition, and I think this is the point that Dr. Dahlberg was trying to make, the issue is more than just breeding. A stable resistance to plant diseases can be achieved only with genetic diversity. The emphasis, however, perhaps to be on management, not breeding, per se. Breeding techniques have evolved well, but we have a lot to learn about managing genes, cultivars, and cultural practices to effect lasting stable resistance.

In conclusion, we suggest the 1970 law should be reexamined at length before any amendments to it are passed.

As the 1972 panel appointed by the National Academy of Sciences stated:

> The long-range effect of the Variety Protection Act on germ plasm development, preservation, and exchange should be studied.

Thank you, Mr. Chairman.

Mr. DE LA GARZA. Thank you very much, Ms. Hinkle.

Mr. Wampler?

Mr. WAMPLER. I have no questions.

Mr. DE LA GARZA. Thank you again, Ms. Hinkle.

[The prepared statement of Ms. Hinkle follows:]

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TESTIMONY
before the
U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON AGRICULTURE
SUBCOMMITTEE ON DEPARTMENT INVESTIGATIONS
OVERSIGHT, AND RESEARCH
Washington, D.C. 20515

APRIL 22, 1980

on

H.R. 999 - AMENDMENTS TO THE
PLANT VARIETY PROTECTION ACT OF 1970

MAUREEN K. HINKLE
ENVIRONMENTAL DEFENSE FUND

The Environmental Defense Fund (EDF) appreciates this opportunity to testify before the House Agriculture Subcommittee on the Plant Variety Protection Act of 1970 (PVPA). The past decade of monitoring pesticide problems has brought to EDF an appreciation of many related factors involved in the task of producing and protecting our food supply.

We therefore welcome this opportunity to go on record as favoring Congressional focus on genetic plant resources and germplasm programs. We urge high priority for this vital issue which deserves thorough, comprehensive hearings, with testimony from a broad range of interested scientists. The views of officials and scientists in other countries should also be sought before action by Congress on this international issue.

Environmental Defense Fund, 1525 18th Street NW, Washington, DC 20036 (202) 833-1484
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In our view, the H.R. 999 amendments are framed narrowly, but they in fact have far-reaching consequences. We suggest that the impact of the 1970 Law needs to be ascertained before broadened to include additional food crops. After a review of the legislative history of the 1930 Law, hearings on patent law revision in 1968, and the 1970 Act, we respectfully oppose H.R. 999 on the following grounds.

We believe the PVPA contributes to scientific and legal problems on plant variety restriction to which H.R. 999 would only add. The PVPA inhibits free exchange and access to information on germ plasm. Policy implications of this legislation, of concern to us, include genetic uniformity, genetic vulnerability, and "genetic suffocation" or disappearance of traditional varieties. As mankind has been plagued by pests since ancient times, epidemics have had, and will continue to have, devastating effects on crop production and thus on the stability of human societies. Genetic vulnerability has been a major aspect of such episodes.

If patenting of seeds accentuates genetic uniformity, we should know what part this protection plays and how to encourage genetic diversity. Finally, we would like to comment on the role of germ plasm diversity in meeting the need to produce food for a growing world.

Legislative History

Patent laws have been in force since 1474 (in Venice), but the Plant Patent Act of 1930, signed by President Hoover on May 23, 1930,

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was the first law to provide for special patents for plants.[1/] Agreement was reached in 1929 by interested parties to limit patent legislation to asexually reproduced plants after official information that "the inclusion of sexually reproduced plants resulting from the crossing of the male and female would show variations in plant characteristics which would make enforcement under the patent law impractical or impossible."[2/] The bill was passed without discussion or recorded vote, and has been described as "thrown together hastily and practically no thought given to many of the problems involved."[3/]

President Johnson appointed a Commission to review the United States patent systems on July 23, 1965. Of the 35 recommendations presented on November 17, 1966, Recommendation IV dealt with Plant Patents, as follows: "All provisions in the patent statute for plant patents shall be deleted, and another form of protection provided." The reason, given by the President's Commission, was that it did "not consider the patent system the proper vehicle for the protection of such subject matter," and urged further study

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1. Patent Law Revision: Hearings on S. 2, S. 1042, S. 1377, S. 1691, S. 2164, S. 2597 before the Subcommittee on Patents, Trademarks, and Copyrights, Committee of the Judiciary, U.S. Senate, 90th Cong., 2d Sess, part 2, January 30, 31, Feb. 1, 1978, at 788, 792 (Paper by Donald G. Daus, "Plant Patents: A Potentially Extinct Variety," Econ. Botany, Oct.-Dec. 1967).

2. Plant Variety Protection Act Hearings before the Subcommittee on Agricultural Research and General Legislation of the Committee on Agriculture and Forestry, U.S. Senate, 91st Cong., 2d Sess., on S. 3070, June 11, 1970, at 80 (Statement of Paul C. Stark).

3. Allyn, R.S., The First Plant Patents, a discussion of the new law and patent office practice (1934), at 57.

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to determine the most appropriate means of protection."[1/]

Pursuant to the Commission's recommendation and in preparation for Senate hearings, the Patent Office requested comments in the Federal Register on January 3, 1968. The responses indicated considerable division within the agricultural community. Objections were raised as to the difficulty in administering a program wherein differences in identification of varieties would prevail, and such patents would inhibit governmental research in this area. The value and enforcement of such protection were thus questioned. Consequently, the Patent Office withheld comment on the amendment to extend patents to sexually reproduced plants until supporters of the provision could develop "more convincing factual evidence that the Amendment is both feasible and necessary."[2/]

The U.S. Department of Agricultural (USDA) opposed extending patents to sexually produced plants on the following grounds: such patenting would (a) interfere with the free exchange of information, (b) the patenting of sexually reproduced plants is scientifically difficult or impossible because of the inherent variability of seed-propagated plants, and (c) difficulty of

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1. Patent Law Revision Hearings (1968), supra, at 648. ("Legal Protection for New Plant Varieties which Reproduce Sexually," by the National Council of Commercial Plant Breeders, (Jan. 1968).

2. Patent Law Revision Hearings, supra at 884-85 (Letter of May 31, 1978, from Edward J. Brenner, Commission of Patents, Department of Commerce, to Senator McClellan.)

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proof in infringement litigation as well as difficulty in enforcement of a patent in seed-producing plants.[1/]

In 1968, opposition to plant patenting for sexually produced varieties also included "practically all the plant breeders, geneticists, horticulturists, and other scientific groups . . . interested in the advancement of the programs and activities, both public and private, forthe improvement of varieties of plants." These groups were not so opposed to plant patenting per se as much as these scientists, familiar with plant breeding and improvement of horticultural varieties, were "unanimous in urging very careful study of any basic changes in the plant patent law [of 1930 which excluded sexually produced plants] until full consideration of the far-reaching consequences could be made by the various groups interested and directly affected by such proposed changes."[2/]

At the time Congress was considering revisions of the Patent Law in 1978, the American Seed Association urged extension of the 1930 Act to include sexually reproduced plants. As the representations of the Pioneer Seed Company described the action, "Initially they were naive enough to think they could develop a system that would be within the Patent Act itself and a bill was introduced to merely expand the Plant Patent Act to include sexually reproduced plants as well as the asexually reproduced plants. They

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1. Patent Law Revision Hearings, supra, at 715-19.

2. Patent Law Revision Hearings, supra, at 866 (Report submitted by Paul C. Stark, Stark Brother's Nurseries and Orchards, Louisiana, Missouri, Mar. 28, 1968).

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found immediate opposition to this from many sectors and it proved politically unavailable to them. They then started looking for a different system that would be politically available."[1] Protection from the Department of Agriculture was accepted in 1979 as "better than nothing."[2]

The 1970 legislation was essentially drafted at a meeting on March 25-26, 1979, between officials of the seed associations, seed control association, the State Agriculture Experiment Station's Directors, and USDA's ARS and Consumer and Marketing Service.[3] With the protection of plants to be administered by USDA as a "registration" program, opposition was reduced to Campbell Soup Company and the American Frozen Food Institute for whom Section 144 was added to exempt the soup vegetables. The provision for farmers to produce certified seed for their own use was also allowed, which eliminated opposition from that group. As in the case of the 1930 Act, the 1970 Act was passed with no recorded vote.

Scientific and Legal Problems of Plant Variety Restrictions

The effect of the 1970 Law is still unknown and scientific and legal questions raised in 1968 and 1970 are still unanswered. For example, the legal significance of the word "variety" has not been

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1. American Bar Association, 1970 Summary of Proceedings, Section of Patent, Trademark and Copyright Law, at 71 (Statement of Dale Porter).

2. Id. at 72.

3. House Hearings 1970, supra, at 56 (Statement by Allenby L. White, Chairman of the American Seed Trade Association's Breeders' Rights Study Committee).

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construed, and plant patents, either sexually or asexually produced, have as yet no judicial yardstick as to patentability.[1] Distinctions between patents, patent-like rights, and breeder's rights also need to be clarified. Breeder's rights require prior authorization for production for commercial markets of the reproductive or vegetative propagating material (including whole plants) of the protected variety.[2] Utility, or meritorious performance, is not required for conventional breeder's rights, whereas a new patent must be useful. The rights of a breeder are positive, as compared to the patentee's right to exclude others from reproducing, using or selling the variety, i.e., a monopoly.[3]

Before patent-like rights are approved, however, the "invention" must be capable of identification and distinction for the life of the patent right granted to it. If the certificate for exclusion is to confer the temporary legal monopoly upon the plant variety, it must be capable of precise definition and delineation

One insurmountable difficulty of concern to breeders is the inherent instability and variations of seed-propagated plants. It has also been called genetic drift or constant shift. As the past

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1. Patent Law Revision Hearings, supra, at 790.

2. 1968 Senate Hearings, supra, at 793 (Article 5 of the Convention of Paris for the Protection of New Varieties of Plants, 1961).

3. Allyn, R.S., supra, at 46.

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President of the Crop Science of America stated, "The variability in sexually reproduced varieties and changes in type attributable to genetic shift would vitiate the intent of the patent system, which rests on the protection of unique and reproducible discoverings."[1/] The variations produced in seed-propagated stock by different environments cannot be determined or predicted in advance. As the President of the American Frozen Food Institute testified in 1970, "Sexually produced varieties are on the average more variable and unstable from area to area, season to season, and generation to generation than are those asexually reproduced."[2/] Moreover, verification itself may require growing under different environments which is an expensive and time-consuming process that small companies cannot afford.

The difficulty of description of a seed-reproduced plant with its variance over the years may make it impossible to positively identify the new variety and proving infringement. Few infringement suits have been filed, in the eight years following the first plant patents for a seed-reproduced plant variety (1972). The next decade, however, can be expected to be far busier for the Plant Varieties Office[3/] which now needs eight full time professionals

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1. Patent Law Revision Hearings, supra, at 869 (Letter to Edward J. Brenner, Commissioner of Patents, Department of Commerce, from A.A. Hanson, Chief, Forage and Range Research Branch of the Crop Science Society of America, dated Jan. 17, 1968).

2. Plant Variety Protection hearings, House of Representatives, Subcommittee on Departmental Operations of the Committee on Agriculture, on H.R. 13424, H.R. 13631, H.R. 13658, H.R. 13901, H.R. 14332, and H.R. 15226, 91st Cong., 2d Sess., June 10, 1970, at 58.

3. See also letter from Professor Richard Levins, population ecologist and geneticist, Harvard University, to Rep. Kika de la Garza, dated April 10, 1980, elsewhere in these hearings.

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to process 110-125 applications per year.[1] Verification can be expected to be expensive and involve considerable controversy.

The Effect of Plant Patents on Exchange of Information on Germ Plasm

The 1970 legislation was requested in order to bring legal protection to plant varieties in the United States which existed in Western Europe, although the United States was the first nation to provide special patents for plants (in 1930). The argument was then, and continues now, that plant protection will "greatly stimulate private plant breeding."[2]

Europeans and international organizations concerned with plant protection, however, have expressed their opinions that plant protection has restricted free exchange of germ plasm. FAO, for example, expressed the following concern as recently as April 17, 1980 in a letter to H.W.S. Horvill, British Association of Plant Breeders, from O. Brauer, Director of FOA Plant Production and Protection Division:

> FAO, as well as other agencies within the UN, are extremely concerned with the potentially disastrous situation arising from genetic erosion. There is no doubt whatever that genetic erosion has been accelerated by the widespread replacement of genetically diverse cereals by uniform varieties over very large areas without stimulating corresponding efforts to conserve genetic diversity at the same time. This last has been left to FAO and, more recently, to IBPGR, to organize, often only when a serious situation already exists. . . .

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1. According to Commissioner Leese (April 17, 1980), there have been 1053 applications for new plant varieties by USDA since 1970. 671 have been granted. The budget of this office, which was supposed to be self-sustaining, has been reduced to $359,000. The three infringement suits involved varieties of a lima bean, a cotton, and a barley.

2. U.S. Code Congressional and Administrative News, Vol. 2, 91st Cong., 2d Sess., 1970, at 5083.

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> As for the impact of plant varietal legislation on genetic resources, it is a fact that where such legislation is in force, increased obstacles exist to the full and free exchange of germ plasm to which FAO and other UN agencies are dedicated. Plant varietal legislation is concerned with establishing proprietal rights over certain genetic resources and this cannot but have a limiting effect on their availability. 1/

Also, as Declan J. Walton, FAO Director of IAA, wrote to L.E. Huguet, FAO Director of FOR, on February 28, 1980, UPOV's influence on plant breeding has already encouraged "private sector activities at the cost of a corresponding reduction in the public sector." (Emphasis supplied.)

Similarly, E.J. Wellhausen (Rockefeller Foundation) wrote to Dan McCurry (Consumer Federation of America), on August 3, 1979 that CIMMYT 2/ breeders take a strong stand against seed patenting legislation because "it restricts the free exchange of genetic materials."

In contrast, and prior to the 1970 Law, USDA, and other agencies such as the Agriculture experiment stations, and private breeders engaged in a program developing and introducing new and better seed varieties. When a new variety was considered valuable, an official notice of release signed by USDA and the cooperators was issued. Anyone could then grow or propagate these new varieties for sale to the general public. This encouraged the spread of new varieties.

The success of this program in developing new, disease-resistant

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1. The International Board for Plant Genetic Resources (IBPGR) with a secretariat of six, is an independent body created in 1974.

2. International Maize and Wheat Improvement Center

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and high yielding varieties was attributed in large measure to the free interchange of information, "experimental plants, and germ plasm among research workers without fear of misappropriation and use of any of this material."[1/] Indeed, as the Vice President for vegetable research of Campbell Soups told this subcommittee in 1970, "Unprecedented progress has been made under the existing system (prior to 1970) free of artificial controls and protection" wherein Campbell Soups released to the public domain 32 varieties of tomatoes, and many other varieties. The success of Campbell Soups' breeding efforts depended on the store of germ plasm and genetic material obtained on a free exchange basis among plant breeders from throughout the world, public and private.[2/]

In addition, as the President Elect of the Crop Science Society of America (CSSA) told the Congress in 1968:

> The CSSA registers new varieties of field crops and superior germ plasm. This provides published information to the public on the origin and special value of new varieties. This assures that duplicate names will not be used in the register. However, the service is voluntary and no policing is involved. The U.S. Department of Agriculture also makes news releases about new seed varieties we develop and periodically we publish descriptions of these. In many cases the "distinctiveness" of these varieties is physiological and not of taxonomic value; in fact many varieties look alike. [3/]

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1. Patent Law Revision Hearings, 1968, supra at 715.

2. 1970 House Hearings, supra, at 57-58.

3. 1968 Senate Hearings, supra, at 870.

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The interdependence of public agencies, seed companies and processors, and a willingness to exchange information and germ plasm worked to the benefit of crop improvement through plant breeding prior to 1970. Most of the 450 to 500 new cultivars released each year represented minor genetic advances and "fine-tuned" adjustments to changes in production, harvesting, processing, and marketing procedures.[1/] Great leaps ahead are not the rule, and the most desired characteristics "are generally achieved bit by bit with barely observable improvements over preceding generations."[2/]

This trend may have been reversed by the 1970 legislation. Just prior to the passage of the PVPA in 1970, there was observed "a perceptible reluctance among plant breeders to exchange genetical material."[3/] This was deemed to have been brought about in anticipation of plant protection legislation in the United States; similar to that in Europe. The emphasis should be on better, not necessarily more, varieties and those that will stand the test of time. The public sector must continue its creative efforts in breeding. In addition, "Industry cannot replace the public agencies as vehicles to solve the high risk projects that need to be undertaken in breeding if we are to progress."[4/]

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1. Conservation of Germ Plasm Resources, supra, at 23, and Genetic Vulnerability of Major Crops, supra, at 268.

2. Plant Variety Protection Act Hearings, on H.R. 13424, before the Subcommittee on Oversight, Investigations and Research, Committee on Agriculture, 91st Cong., 2d Sess., June 10, 1970, at 58. 1970 House Hearings, supra, at 58 (Testimony of Thomas B. House, President, American Frozen Food Institute).

3. Id. at 57. (Testimony of Eldrow Reeve).

4. National Academy of Sciences, Genetic Vulnerability of Major Crops, supra, at 268.

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As USDA told the Senate Judiciary Committee in 1968, "It is safe to say that the high quality and abundant harvests of our seed produced crops would not have reached their present portions, but for the possibility of cooperation which the absence of patents on this category of plant engendered." (Emphasis supplied.)

Absence of patents has broad implications. For example, penicillium breeding contributed the major factor in reducing costs of penicillin. The pioneer selection had been done by the Department of Agriculture, and its policy of not patenting plant material may explain the absence of patents. The dramatic reduction in penicillin cost by strain selection and X-ray mutation is one of the most spectacular economic feats of plant genetics. This government financed breakthrough occurred a decade after discovery of the drug.[1/]

Another problem involves security. To completely protect one's breeding program, whether private, federal or state, agencies would have to carefully guard all promising breeding material, and this would force public agencies to apply for public patents for all new varieties released. "Preliminary evaluation of 'experimental' varieties before their release is very important. To guard against possible loss of one's 'outstanding' line would require very close supervision and severely restricted use of advanced testing programs."[2/]

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1. Patent Law Revision Hearings, supra, at 791 (Paper by Donald G. Daus).

2. Patent Law Revision Hearings, supra, at 800.

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Even with expensive safeguards, patentable seedlings might well escape, and without authority, be patented by others. This apparently occurred when a certified variety was obtained from the Mexican Government and then patented in Europe. Also, varieties have been stolen from the CIMMYT breeding program, multiplied in the United States, and patented under the PVPA.[1/]

Uniformity

Section 41 of the PVPA (7 U.S.C. §2401) requires that a plant's "novel variety" must show "distinctiveness," identifiable by "one or more identifiable morphological, physiological or other characteristics." However, as the National Academy of Sciences pointed out, "[t]o achieve novelty, uniformity, and reproducability, breeders may concentrate heavily on incorporation of easily identifiable morphological traits into new materials and on achieving a high degree of homogeneity in them."[2/] The broad germ plasm base and genetic diversity may thus be lost. This is the connection between patenting seeds and genetic uniformity.

There are, of course, many contributing factors to the genetic uniformity of our crops, but plant breeding for commercial purposes can be an enormous factor. As the National Academy of Sciences said:

> . . . the selection process can itself result in serious loss of germplasm. Selection for particular traits at the expense of others very often leads to a narrowing of genetic diversity in the species. The reduction in genotypes is particularly

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1. Mooney, P., Seeds of the Earth, August 1979, at 78.

2. National Academy of Sciences, Genetic Vulnerability of Major Crops, 1972, at 37.

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> likely to occur as techniques for mass rearing are adopted and culture conditions become more uniform through artificial control. The discarding of all strains except those best adapted to the conditions of domestication becomes a serious threat to the maintenance of the organism if environmental conditions change, if susceptibility to predators changes, if parasites or pests develop, or if there is need to select for different sets of characteristics. Limiting the available types in a collection can be particularly serious if human or other encroachment on natural habitats has meanwhile depleted species diversity or has eliminated the species from natural communities. [Emphasis supplied.] 1/

Commercial requirements also contribute to genetic uniformity. Section 41(a)(2) of the PVPA requires "uniformity in the sense that any variations are describable, predictable and commercially acceptable." (Emphasis supplied.) Grading standards for minimum price support penalize growers unless produce meets commercial grading criteria. For example, in mixed peanuts warehousemen and shellers prefer to handle one or at best a few varieties, since separation of types and quality segregations add to their labor costs.2/

Other segments of industry directly or indirectly encourage a narrow genetic profile by seeking to standardize quality attributes of end-use produce. Buyers of processed and fresh market beans and peas are very specific in their demands concerning the type and quality they will accept. The National Academy cited this as the major reason why a narrow genetic base underlies most snap bean and pea varieties now grown, as well as a host of other crops.3/ The need for high levels of uniformity in vegetable

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1. Conservation of Germplasm Resources -- An Imperative, 1978, at 22.

2. Genetic Vulnerability of Major Crops, supra, at 22.

3. Id. at 238, 246.

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crops plus dependence on breeding for disease resistance render the vegetable industries in the United States vulnerable to disease epidemics.[1]

Not only at the marketplace and in the processing line, but in the field, factors at work operate to force uniformity. Ears of corn must be a uniform height for mechanical pickers. Stalks must be of uniform height in order not to interfere with weed-killing machinery. Tomatoes must ripen simultaneously so they can be mechanically harvested. "If the genes for this uniformity happen also to make the crop more susceptible to a disease, an epidemic is in the making."[2] (Emphasis supplied.)

Mankind's experience with epidemics has made possible awareness of certain relevant factors necessary to predict, and therefore reduce, losses due to their occurrence. These three factors are essential for epidemic pest populations: weather, pest, and host.[3] In this triangle, plants that are uniform render the crop vulnerable to pests. Disease begins in discrete areas that become epidemic if it spreads rapidly over large areas. How epidemics spread has been hypothesized to be related initially to the size of the pest population and the weather, but most important is the population of plants. Crowding and uniformity of plants can, for example, form a canopy of closely spaced crops which produce their own weather, or microclimate. A rapid increase can follow, leading to an explosive outbreak of disease, or

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1. Genetic Vulnerability of Major Crops, supra, at 267.

2. Id. at 29.

3. Id. at 6, 26 and 27.

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epidemics.[1] When uniform crops exist over large areas, the situation is ripe for epidemics.

Although epidemics can often be predicted, genetic vulnerability is sometimes unforeseen. A classic example was

> found in oats. The Victoria gene for crown rust reaction was bred into . . . oat varieties . . . grown over extensive acreages. The presence of this gene permitted a fungus, Helminthosporium victoriae Meehan and Murphy, to parasitize and practically destroy a large part of the acreage of oats that carried the Victoria gene. This vulnerability was totally unexpected. [2]

Some of this unforeseen vulnerability can be eliminated in plant breeding programs. In the case of the vulnerability to Victoria blight, the vulnerability surfaced after new varieties were moved to new environments and a variant of a fungus developed and spread easily.

Yet another facet of the genetic vulnerability problem is the potential for the future. The National Academy cautioned the scientific community about "tunnel vision," as follows:

> Scientific tunnel vision may have obscured somewhat the significance for corn of the oat epidemic and of the phenomenon of drug resistance. The Texas

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1. Genetic Vulnerability of Major Crops, supra at 29, 30.

2. Id. at 143.

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> male-sterile corn was deployed over a wide area, as was DDT against flies, with similar consequences: a new strain of H. maydis overcame the Texas strain of corn in the same way that a new strain of house flies overcame DDT. 1/

Unfortunately, insecticide resistance was paid precious little scientific attention for decades despite its existence since 1914, in the San Jose scale to lime sulfur spray. A look at the numbers of documented cases of insect resistance gives a clue to what may be in store for genetic vulnerability:

1948	12
1951	16
1954	25
1957	76
1960	137
1963	159
1968	224
1976	364
1980	400 2/

It was the widespread use of insecticides which brought on and hastened the incidence of resistance. Crop uniformity over large acreages could produce a similar effect for epidemic potential. The challenge, therefore, for breeders is to provide diversity. He must, as the National Academy panel urged, "build redundancy into a back-up system."[3/] In addition, they must search for new genes, and develop gene pools to preserve those they have..

1/ Genetic Vulnerability of Major Crops, supra at 295

2/ Metcalf, R.L., "Changing role of insecticides in crop production," Assn. Rev. Entomol., 1980. 25:228.

3/ Genetic Vulnerability of Major Crops, supra at 295.

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1/ Genetic Vulnerability of Major Crops, supra at 295

2 / Metcalf, R.L., "Changing role of insecticides in crop production," Assn. Rev. Entomol., 1980. 25:228.

3/ Genetic Vulnerability of Major Crops, supra at 295.

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Diversity is the key. In business and finance, diversification hedges against high risk. "Diversity also aids stability in the biological world,"[1] and is the best insurance against epidemics.[2]

The role of germ plasm diversity in meeting the need to produce food for a growing world

In its discussion of the role of plant genetic resources in agriculture, the National Academy stated

> In cultivated crops germplasm resources are required to provide the genetic diversity needed to ensure future production. Plant genetic resources include wild species related to the cultivated species, folk varieties (or land races), obsolete and current cultivars, useful mutants, and stocks with improved combinations of genes developed as a consequence of research. This array of genetic diversity is essential to meet the constantly changing problems imposed by consumer needs, agricultural technology, environmental changes, pests, economic conditions, and other factors. [3]

In addition, a stable resistance to plant diseases can be achieved only with genetic diversity. The emphasis, however has to be on management, not breeding per se. Breeding techniques have evolved well, but "we have much to learn about managing genes, cultivars, and cultural practices to effect lasting stable resistance."[4]

1/ Browning, J.A.,"Corn, Wheat, Rice, Man: Endangered Species," J. Environ. Quality, Vol. 1, no. 3, 1972, 210.

2/ Id. at 294.

3/ Conservation of Germplasm Resources, supra at 23.

4/ Browning, supra at 210.

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On an international scale, cooperation should be greater and open. Yet, U.S. efforts have constrained and impeded a spirit of cooperation. In its discussion of germplasm, the Office of Technology Assessment made the following statement.

> Seeds and other breeding materials collected in centers of crop diversity are the only proven source for developing natural resistance in crops. Furthermore, they will be needed even if the dreams of genetic engineers become reality. For nearly a decade and a hlaf, the United Nations' Food and Agriculture Organization has led in planning international efforts to collect and conserve crop variability. Since 1973, AR has had a similar plan to minimize genetic vulnerability of the nation's crops through germ plasm collection and conservation. Unfortunately, both U.S. and international efforts have not been adequately supported and developed to meet the needs of crop protection and related scientists. If these diverse genetic materials are not available to plant breeders, the long-term potentials of developing natural resistance and tolerance cannot be realized. The corollary task of understanding the basic mechanisms and genetics or resistance factors for each crop is also dependent upon the availability of such germ plasm.
>
> Our plant breeders, pathologists, and entomologists need first-hand experience with crops in the world centers of diversity. This can be facilitated by encouraging the expansion of national and international efforts. 1/

1/ OTA report, Pest Management Strategies, GPO stock no. 052-003-00708-8, Constraints Section, at 22 and 23. (October 28, 1979).

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Conclusion

We suggest that the 1970 Law should be reexamined at length before any amendments to it are passed. As the 1972 panel appointed by the National Academy of Sciences urged, "The long-range effect of the Variety Protection Act on germ plasm development, preservation, and exchange should be studied."[1/]

Put more bluntly, the study said

> The law infrequently outruns biology; thus federal regulations in Canada designed to promote uniform wheat quality impose stringent requirements on development of new wheat varieties in that country. The indirect effect of this legislation has been to narrow the germ plasm base and increase potential vulnerability of Canadian wheat. A similar effect has developed from the enforcement of a one-variety cotton law in the San Joaquin valley of California and, more generally, from the recently enacted Federal Plant Variety Protection Law. [2/]

An even graver indictment is contained in Erna Bennett's letter to the editor as follows.

> In Europe over the past nine centuries, a great wealth of genetic diversity in vegetable crops has evolved and been preserved by numberless individual cultivators which, in a single fell swoop by ignorant legislators out of touch with scientific opinion, now stands in danger of almost total extinction. [3/]

1/ Genetic Vulnerability of Major Crops, supra at 153.

2/ Id., at 291

3/ Letter to the editor of United Nations Development Forum, Geneva, Nov.-Dec., 1979, from E. Bennett, Genetic Conservationist, FOA, Rome. See also August 14, 1979 letter to Senator Eagleton from Bob Bergland admitting, "The prediction that by 1991 three-fourths of all vegetable varieties grown now will become extinct may prove to be correct. Obsolete varieties (sic) are being replaced by improved varieties adapted to extended areas of agriculture."

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Agricultural leaders around the world also "recognize that the genetic variability of crops is shrinking and that valuable plant genetic resources are thereby being lost." 1/ Two points were drawn by the 1978 National Academy panel:

> (a) vulnerability stems from genetic uniformity; and (b) some American crops are on this basis highly vulnerable. This disturbing uniformity is not due to chance alone. The forces that produced it are powerful and they are varied. They pose a severe dilemma for the sciences that society holds responsible for its agriculture. How can society have the uniformity it demands without the hazards of epidemics to the crops that an expanding population must have? 2/

The challenge is enormous, and with significance for the whole of society. We hope our testimony has helped to focus on some of the aspects involved in the Plant Variety Protection Act and amendments proposed for it.

1/ Conservation of Germplasm Resources, supra at 24.

2/ Id., at 25.

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Mr. DE LA GARZA. Continuing, we have this afternoon Ms. Barbara Schlei in attendance. Ms. Schlei, even though we had someone from your office as an expert witness to answer questions, we would welcome you if you would care to either present a statement or discuss some of the testimony or assist us in whatever way you see fit.

STATEMENT OF BARBARA SCHLEI, ADMINISTRATOR, AGRICULTURAL MARKETING SERVICE, U.S. DEPARTMENT OF AGRICULTURE

Ms. SCHLEI. Thank you, Mr. Chairman.

I might take this opportunity to make a few comments.

One issue that I think might not have been fully discussed with the committee during the proceedings so far is what I perceive of as the very important question of preservation of germplasm.

I think that this is a very real, very substantial, and very important issue in this country today. I think, however, it is terribly important for the committee to recognize that this issue has nothing whatsoever to do with the amendments before the committee nor with the Plant Variety Protection Act itself.

It is an important issue. It is an issue to which I hope this committee and the Department of Agriculture will increasingly devote its attention and concern, but it is an unrelated issue to the matter before this committee today.

I might say that I think the Plant Variety Protection Act indeed encourages the production of new varieties. Through the Department of Agriculture, through SEA and AMS, we have now in Fort Collins on record and stored 1,500 crops of species and over 350,000 accessions.

In addition to that, through the efforts of the Plant Variety Protection Act, we have now on computer descriptions of over 70 crops representing 15,000 different varieties. And, indeed because of the Plant Variety Act, we have been able to supplement the collection at Fort Collins with the germplasm of the 671 seeds representing those varieties that have received certificates under the Plant Variety Protection Act.

Another significant issue, I think, is the basic opposition to patents themselves. Mr. Chairman, I think that the testimony of Mr. Dunner of the American Patent Law Association is extremely clear, and I would recommend it to the committee for careful consideration on the underlying question of patents.

I think that what we are seeing today is a clear need on behalf of agriculture that we in the Department of Agriculture and at the land-grant colleges continue the important work of developing new seeds to increase the productivity of our agriculture. Looking at the problems of inflation that we face, looking at the need for new technology in our industry, we must provide, as the chairman mentioned earlier, the economic incentives for industry and for the seed industry and for the individual gardeners and for individual farmers to put funds necessary into research to develop new varieties. This is a very expensive process, and we cannot expect that the private sector will take over this important work in any substantial degree if there is no oppotunity to recoup the risk capital that they have put into the research projects.

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I think that the argument has been raised about the possible detrimental effects of the Plant Variety Protection Act on small farmers. I believe, Mr. Chairman, that exactly the opposite is the case. In fact, only about a quarter of the certificates that have been granted to date have been granted to large corporations. The other 75 percent have gone to individuals and small farmers.

More importantly, if an individual or small farmer puts money into research to develop new seeds, it is only through patent-type protection that that individual can recoup his investment. A large corporation, absent patent law, could readily take that new seed and, through an advertising program, through product differentiation, through the use of a name identified with the seed, could market that seed. There would be no protection outside of this act available to the small farmer.

I think the question has been raised about the free exchange of information. That is a very important concern. But the Plant Variety Protection Act enhances the free exchange of information.

Under this act the methodoloty in developing the new variety must be provided with the application for a certificate. Once a certificate is granted, that information is freely available. If the application for a certificate were not filed, then that information could remain confidential to the developer of the new variety and would not be available to the general public.

Finally a question has been raised about the joining of the International Union for the Protection of New Varieties of Plants. This amendment in no way requires that the United States join UPOV nor would the failure to pass this amendment inhibit the U.S. determintion to join that international association. Those decisions are totally unrelated. It is true that that organization recommends that we would be more consistent with it if our protection were for 18 years, but we would be as free to join it with our protection at 17 years. This amendment has nothing to do with that determination which is a separate and distinct question. Nor is there any reason to believe that if we were to join an international association that that would necessarily mean that this country would change its seed laws in any way to be similar or adopt the practices of foreign countries. That would be a matter for this Congress to decide.

Thank you, Mr. Chairman. I would be happy to answer any questions.

Mr. DE LA GARZA. Thank you very much.

Mr. Wampler?

Mr. WAMPLER. I have no questions, Mr. Chairman.

Mr. DE LA GARZA. Do you have any information as to how many new varieties or hybrid varieties have been registered since the enactment of the Plant Variety Protection Act?

Ms. SCHLEI. Yes, Mr. Chairman. We have issued certificates at this point in time for 671 varieties.

Mr. DE LA GARZA. Have you any breakdown as to how many of those might have been hybrid?

Ms. SCHLEI. None. We do not issue certificates on hybrid varieties.

Mr. DE LA GARZA. Thank you very much.

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We heard from Mr. Leese of your agency before, but let me ask you again since you are the head of the agency. This bill has no controls whatsoever—you won't have any supervisory control over individuals and individual farmers and little home gardens?

Ms. SCHLEI. This bill has absolutely no regulatory provisions of any kind and in no way regulates or inhibits what seeds are available to farmers in this country.

Mr. DE LA GARZA. You are not looking for that, are you?

Ms. SCHLEI. We are not looking for that and we would oppose any such restriction on the agriculture of this country, Mr. Chairman.

Mr. DE LA GARZA. So that little farmwife out there that someone has gotten to write to us saying that if H.R. 999 passes, she is not going to be able to have her little garden in the back yard—she does not need to worry too terribly much about this, does she?

Ms. SCHLEI. I hope not, Mr. Chairman. Certainly if she does, it has nothing to do with this legislation.

Mr. DE LA GARZA. I am going to be able to have my little chili patch, and she can have her garden.

Mr. SCHLEI. And we hope, sir, that through the efforts of the private sector we will enhance people's ability to get us hotter and bigger chilis.

Mr. DE LA GARZA. That is my problem. Apparently the varieties that I grow good in south Texas, when we bring them up to this zone, they are not as hot for some reason.

Ms. SCHLEI. That is because of the beautiful land you have out there in the valley, Mr. Chairman.

Mr. DE LA GARZA. I need someone to do research so that I can grow them here with the same consistency and as hot as they are down there.

We need a little bit more research on that.

Thank you very much, Ms. Schlei. We are always happy to have you with us.

Ms. SCHLEI. Thank you, Mr. Chairman.

Mr. DE LA GARZA. The next witness scheduled is Mr. Pat Mooney.

We are very happy to have you here, Mr. Mooney. We will hear from you at this time.

STATEMENT OF PAT MOONEY, AUTHOR, MANITOBA, CANADA

Mr. MOONEY. Mr. Chairman, thank you very much for having me here.

I am coming from Canada, and I think that perhaps your willingness to hear from me is some recognition of the international implications of these issues before us today.

As I know you are aware from your opening comments, this is an issue which is now being debated in many countries in the world. As this meeting goes on here, there is debate in Ireland, Australia, and Canada related to the plant breeders' rights, or plant variety protection, as it is called in different countries.

One of the reasons why that debate is underway now around the world is because of a concern of many farm organizations—you heard from the National Farmers Union here today—but others in other countries as well, that in fact what the issue before us is the

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future of plant breeding in our world. That is, how we can find the best way to create the most innovation possible.

There is a concern by those same organizations that a patent mechanism is not the most suitable one to allow for that innovation.

I think the point here might be made and I think most of the references, in fact, refer to things that have been done in the United States at the U.S. Senate committee hearing in 1958 on the revisions to the patent system in this country. This raised some doubts as to what empirical evidence actually exists anywhere in the world to show that there is a connection between patents and innovation.

I would like to dwell upon that a little bit only in the context that we have been hearing today on several occasions that patents are not a regulation, and that there is no effort in this legislation to regulate. I think there is a large body of economical opinion that argues that the patent itself is a form of regulation. In fact, that a patent is really a state intervention into the marketplace—an artificial intervention by government to protect a monopoly position or to create a monopoly position for a company or an individual.

That in and of itself speaks of a kind of regulation by government. I think that anytime that happens there is a need for the government to be quite clear as to why it is taking this step to regulate.

I would take that a little further and say that as most recognize, I believe, in all sectors and all views of economists, that monopoly in effect is a constraint on competition. I think it would be argued, and I think many people here in the room would argue, that the best way to create innovation in our society is through creation of competition—the assurance of competition. A patent system creates an artificial monopoly because it cannot seem to encourage exactly that kind of competition that creates innovation.

If I can, I would like to mention an article that was recently in the Wall Street Journal which looks at the problems in the pharmaceutical industry and makes a particular point of what they describe as the Rip Van Winkle effect. This is related to the drug industry where they have the protection of 17 or 18 years to sit back and let their patent work itself out. You can almost hang "Out to Lunch" signs on R. & D. programs during the time of that patent protection.

I think that that perspective on the patent system is an important one to look at—the decline in competition that that tends to create.

I would also say that we need to look closely at the UPOV convention itself—the Union for the Protection of New Varieties of Plants.

I think when Dr. Mast has an opportunity later today to give his presentation on UPOV that we will have the opportunity to hear on one of the rare occasions a natural description of UPOV and how it works—perhaps, and I would hope, some documentation on his experience over the last two decades really.

To my knowledge, there have been no studies of any kind and not the benefit of congressional hearings to look at the UPOV convention. There is no empirical data to describe its impact in

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Europe. There is simply no information at all on how UPOV might or has functioned in relation to any specific crops.

There is, however, a lot of concern about UPOV and about how it would operate and what its implications are for farmers. I would like to, if I could, with your permission, table a memorandum which has been produced by the United Nations Food and Agricultural Organization, dated the 28th of February of this year. It is a policy guideline memorandum on the Union for Protection of New Varieties of Plants and FAO's cooperation with that body.

It makes a series of statements here—it is a short memo, sir; only three pages—as to the implications of the international convention.

It does, particularly I think, take UPOV to task on the question of the free exchange of germplasm, a point which we are constantly being told over and over again, but not with statement and not with data, that there is no connection between plant patenting and the free exchange of germplasm.

Well, the United Nations Food and Agricultural Organization was charged with feeding the world's hungry, and they disagree with that. They say that there is that connection.

I would also like to table in that connection some letters provided to us by some well regarded, I think, international experts in this field on their concern with the UPOV convention and this issue of the free exchange of germplasm.

One is a letter from Dr. Brady who is the head of the International Rice Research Institute in the Philippines. Dr. Brady is opposed to plant patenting.

Mr. DE LA GARZA. Are those letters directed to this hearing?

Mr. MOONEY. No, they are not. They are directed to me—I should say that people have sent them on to me.

Mr. DE LA GARZA. For preparation of this hearing? We would have some problems if it is just a letter sent at random even though it be generally on the issue. The FAO document if it is a public document we will have no problem incorporating it in the record.

Mr. MOONEY. It was read into the Irish Parliament, as a matter of fact.

Mr. DE LA GARZA. We will be very happy to follow our Irish brethren in that respect, but with the letters we might have a problem.

Why don't you quote from them. I would have a problem inserting them in the record. However, you are free to quote from them if you would like to.

Mr. MOONEY. Thank you. I have a problem of about 2-percent vision. For me to quote from them would take a long time.

Mr. DE LA GARZA. You could just summarize them.

Mr. MOONEY. Certainly, I would be glad to do that.

Mr. DE LA GARZA. Very respectfully, you would respect my responsibility. If somebody were to question us about inserting into the record a letter that may or may not have been meant for that purpose there could be a problem.

Mr. MOONEY. I can leave it to your discretion to look at the letters and conclude that for yourself.

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Mr. DE LA GARZA. If you have copies available, I would be happy to do that.

Mr. MOONEY. Let me just very quickly identify a couple of the major concerns that are raised related to UPOV.

One of them is this. You have heard it many times here. It is a concern about the lack of documentation. One would think that a government regulation, in a sense an international government regulation which intervenes in the marketplace and has done so for two decades, would afford us with documentation of why they do this and what benefits society has received from that. That documentation is not available.

In a broader context, though, there is concern that the whole international patent system is now changing and that this Government and my own Government of Canada have gone through a long process of looking at the seventh revision to the Harris Convention on Industrial Property.

After a month of meetings and several years of preparation, we find that even in that case the only agreement that has been achieved has been on how to vote when they finally get down to looking at the substantive issues.

The debate around that is a debate which is arguing for considerable liberalization in the patent system. When that debate on industrial patents is finished, finally, it will be at least a year away from now—when that is over I think all experts will agree that the result of that will be that the UPOV convention in plant patents will be a convention which could be described as almost the Neanderthal of intellectual property legislation.

It will be out of date and I think in a sense the U.S. Government and my own Government may have hitched their wagons to a falling star.

It will not be certainly the same convention 3 or 4 years from now as it is today.

I think that UPOV must be looked at in that broader framework of international patent law.

I would then, if I could, look at some of the costs related to the patent system which we don't hear about when we look at the questions related to innovation.

One of the costs of the patent system that I have mentioned is the lack of a free exchange of germplasm. Dr. Normal Borlaug, and I have documentation from him, who is the Nobel Peace Prize winner for his work in the Green Revolution, is opposed to plant breeders' rights and plant patenting. I think it is simply on the basis of the lack of free exchange of germplasm.

Second, again Dr. Brady, the Director of the International Rice Research Institute, on the same basis.

Third, Dr. Glen Anderson, who is in charge of the wheat program and the maize and wheat research program in Mexico is also opposed to it on the basis of a lack of free exchange of germplasm.

Last year, in 1979, there were two meetings held in Europe sponsored by FAO and the United Nations development program which looked at the problems of a free exchange of germplasm and the need for a genetic conservation program in Europe.

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The first meeting could not be concluded because they could not agree on what should be freely and properly exchanged among countries and among individuals.

The second meeting held in December tried to work that out, and I believe it resulted in an agreement which you could drive a truck through. They simply worked out a formula of words which allows anybody to do almost anything they would like to do.

The other kind of cost which has not, to my knowledge, been looked at in the United States and in most countries, is the cost of achieving the kind of patent protection required or, that is, achieving the patent itself.

The point I make here is that it may take in Canada at least 14 years to develop a new wheat variety. But after that, with plant patenting legislation, come the costs of achieving the uniqueness and the uniformity requirements that will allow for a patent. Those are not costs that are of benefit to the farmer. Those are additional costs to achieve the patent itself.

The costs come in two forces. One cost is the additional research requirement and the need for farmers then to pay for that. The second cost is the time delay in getting new varieties on stream because of the extra years that may have resulted, or may have been required, to get that special patent uniqueness which does no benefit to the actual agriculture benefits to the farmer.

A their kind of cost is a cost related to the hoarding of germplasm. I make a distinction there between that and simply free exchange. When someone patents a glass or a microphone, what they are doing is controlling only that end product. Unfortunately, when you patent a plant variety, we create an interest in the genetic material, that is, the initial breeding material, which may not have gone into that plant variety but which may, in fact, be unique in nature. That material can be quite special and there is a special interest in obtaining and holding onto that material.

When I patent a microphone, I do not control the zinc, the tin, the copper, the lead, or whatever, that goes into the making of it. That is available to all of us. But when you patent a plant, when you create the investment interest in having control of a plant variety, you create an interest then in the material then which may be unique and which may not be found anywhere else.

That is a special concern which means we should be especially cautious in this area.

There are other costs as well. There is a cost that Noble Freeman describes in his book, Capitalism and Freedom, in 1962 when he looks at the patent system. That is the creation of a patent monopoly, in directing and ordering certain kinds of research—a desire for plant breeding in this country, or any country, to move forth those products only which can be patented, and perhaps away from those useful plant varieties which may not be patented, and those which may not have the safe stability requirements. This is the multiline variety which cannot be patented themselves, or perhaps a variety which can be described as a hybrid and therefore may not be patentable in this country.

There are those kinds of areas of research which we may not now move toward although they would be of benefit to farmers because they could not be patented.

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I think that kind of cost calculation has to be included when we look at this kind of system.

I will go back again to the FAO document, or policy guideline, which expresses a particular concern in this area that the work that has been done which leads to a narrow genetic base. This is a narrowness of the genetic base that we get, as is described by the National Academy of Sciences, a kind of fine tuning approach.

They carry that a step further, and this may be described as alarmism by some people, but it is from the United Nations FAO, that this kind of narrowness of the genetic base and an unwillingness to do highly innovative and high-risk work that may not give a bottom line result at the end of the year—this kind of experience can result in crop epidemics. This is their phrase—crop epidemics.

I think that concern by the FAO should be the concern of this committee and of the people of the United States before legislation is passed in this country.

There is also concern about the role of transnational enterprises and their involvement in the seed industry.

We are being told a rather fascinating variety of figures—I have yet to hear the same one twice—related to the concentration of the seed industry in the United States and who controls what and how many different varieties. On that basis alone, the basis of even the information that appears to be contradictory on the part of those in favor of the legislation, it would be useful to have a clear final study done of that so that we can quite understand where it is.

I think there has been an argument made here that, no, there really is not a concentration. That again flies in the face of the FAO report which says that there is a concentration underway. It flies in the face of independent European studies. I have mentioned the D. J. Vanderhave study, which is a private leading company in Holland which again identifies the particular interest of chemical companies over the last decade in taking over the seed industry.

There is a host of other studies which are starting to look at this. There is a study in Wisconsin which has started to examine this takeover process.

The question here is not that this may be happening in other sectors of the economy, or is common to them, but it is happening in a sector that is vital to the national security of any country. It is happening to an industry which all of us must consider important—the seed industry—and that is the basis of our food system. This is not washing machines. This is something that is vital to life.

It has been pointed out that—I think rather erroneously—the concern expressed by those who are opposed to the legislation in any country has been solely on the basis of this link between chemicals and seeds. That is, that because of the possibility that the pharmaceutical and crop chemical companies are involved in the seed industry, there will be a dovetailing of the research on chemicals and seeds together. While this is certainly and obviously a danger, it is difficult to achieve, for example, as hybrid wheat is. we have a lot of companies working in this country and in other countries who for decades have been trying to achieve hybrid wheat. They are still working at it even though some say it may

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not be possible. The same type of interest may exist in dovetailing chemicals and seeds together.'

That really is a small side issue of the real implications of chemical companies becoming our plant breeders. The two other points that are rather more important ones and immediate ones are the possibility of the package deal. The chemical and the seed being marketed together using the same marketing system is the danger there—that is, either through pelleting or other methods farmers will end up paying more for their overall package of agricultural imports, chemicals and seeds.

The other danger is the danger that happens, and I refer you to an Australian study that has come out. It is a doctoral thesis on plant variety rights in Australia. It is done by an agricultural economist for the New South Wales State Department of Agriculture. It is just out and looks at the oligopoly trend in the seed industry in several countries—Australia, United States, Canada, Ireland, and so on, with Europe included.

We have an oligopoly in the seed industry area and a danger does arise, and when that oligopoly consists of primarily chemical companies in the seed industry, the company then has the option when a disease attacks a crop for which they have a crop chemical available to make money simply by choosing to do nothing—simply be referring farmers to the chemical that is on the shelf. They would let that run out first, and then bringing on the new varieties down the road.

That possibility to make money and do nothing is a special danger here.

Finally, I think, and I will make this my last point, there has been an estimation of what the costs are and a misjudgment as to the implications of the patent system.

There has been an assumption that patents give people royalties and royalties allow them to make money on their variety. That is straightforward and simple enough. The patent system also allows for through the exclusive rights mechanism to let the plant breeder company detrmine the conditions of sale of the plant variety. The conditions of sale aspect of this system is particularly of concern.

There have been very few lawsuits, as we have been told today, related to plant variety rights in this or any country. Some of them that have happened and some of the reasons why they have not happened are quite fascinating.

I would like to table one document which is from the European Court, D.C. Commission, dated October 12, 1978—the Isolt INRA Agreement. This is a court decision of the European community which disbanded an agreement between INRA—the major French Government's plant breeding program—and Mr. Kurl Isolt of West Germany. He has the exclusive right to market INRA hybrid corn varieties. There they are allowed to the patented. He had the exclusive right to market them in Germany.

The actual implications of this particular lawsuit are not ones that could easily arise in the United States. It relates to the compulsory licensing mechanism which does not exist in, I believe, in most American patent legislation.

But, the findings of the law court on what is happening to the seed industry in Europe, the kind of oligopolistic controls developed

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in Europe, is important, and it does have the same implications for the United States as it does for Europe. I think that should be examined closely.

The concern stated by the court in its findings, which I have here, are that, one, because of ability to set conditions of sale, German farmers were paying 70 percent more for the hybrid corn variety under the exact same conditions as were French farmers. The price was 70 percent above what it needed to be under anybody's judgment as to what the logic of the system was.

Second, because of the ability of Kurt Isolt to have control over some very special varieties of hybrid corn which were valuable, the ability to set a variety of vertical licensing and reciprocal licensing arrangements with other traders in seed in Germany and in France; to withhold seed from the market in a variety of confused and rather technical kind of ways, and to not just withhold seed, but to set conditions which allowed them to gain greater and greater control of the overall seed market in France and in Germany.

That particular aspect of being able to set the conditions of sale beyond just straight out Joe sells to Jack system and gets a royalty for it, is a real concern here. Its allowed for users prices in Europe and it is allowed for special oligopolistic control of the seed industry in Europe.

That, I think, needs to be looked at in this country. It is not that straightforward a mechanism.

And it is, and I stress it again, monopolies, when the government intervenes in the marketplace, that amount to regulation. By fact and by logic that is regulation. For monopoly to allow for exclusive control related to conditions of sale, that is still more regulation and more artificial intervention in the marketplace.

That should be of concern. That is why we say we need the studies. Amazing as it may seem, after decades of work in this area, there simply are not empirical studies that allow anyone to do much more than wave their arms saying that somehow patents lead to innovation. There is no evidence of that. There is no proof of that. There is just a lot of talk.

As was said in 1958 in the U.S. Senate, on a landmark study on this issue, it behooves those who are proposing a constriction on competition to explain why they are doing that.

I believe that is what is happening in the patent system. It behooves those who are proposing any enlargement of the patent system, or any additions to it, to explain why that is so and to justify it to the marketplace.

Thank you for your time. I hope you will allow me to, at your discretion, relate to these letters and add them to your record.

I would also like to add the lawsuit related to the Isolt-INRA Agreement and, if I could, the FAO——

Mr. DE LA GARZA. Would you identify the FAO report.

Mr. MOONEY. The FAO report is dated February 28, 1980. It is entitled "A Memo on Cooperation With the International Union for the Protection of New Plant Varieties."

Mr. DE LA GARZA. Presented by what segment of the FAO?

Mr. MOONEY. By the Interagency Affairs Branch of FAO.

Mr. DE LA GARZA. Does it state if it was by vote or by——

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Mr. MOONEY. No, it is a standard document. It states in the second paragraph that it was the result of a series of meetings held at the beginning of this year among the various departments of FAO, and this is their policy guideline.

Mr. DE LA GARZA. It is a policy guideline, then? It is not an official document policywise, but only a guideline? Does it have the name of an individual?

Mr. MOONEY. Yes, it does. It has the name of the Director of the Interagency Affairs Committee.

Mr. DE LA GARZA. That is all right. We will get it from the document.

Mr. MOONEY. Could I also ask that—because of my haste in trying to get here teday, I have not been able to finish my statement. If the record could be left open, I would like to give it to you in writing.

Mr. DE LA GARZA. We will allow you that privilege if it is prompt. I do not know that we could hold the record open too long.

Mr. MOONEY. A couple of weeks?

Mr. DE LA GARZA. We may move earlier than that.

Will you go back and start on it? If it would be here by the end of the week, it would be very helpful.

Mr. MOONEY. I will do my best.

Mr. DE LA GARZA. You have quoted from the European Court, and FAO, and some other gentleman from the Senate. I would just like to quote to you from Earl W. Olson of Marshalltown, Iowa: "I have been associated with a small company for 25 years. I can honestly say the Plant Variety Protection Act has helped us and our customers immensely. Granted, we have paid a royalty for the use of a patented line but the royalty is insignificant in the total cost of the seed and it is far cheaper than if we had to support a large research staff."

That is from Link's Hybrids, Marshalltown, Iowa.

With all due respect, you can quote from all of your Europeans, but I want to listen to the gentleman from Marshalltown, Iowa.

Mr. MOONEY. Sir, I think you should. You should listen to all the voices you hear on this issue.

Mr. DE LA GARZA. Also, Arnold Thomas Seed Service of Fresno, Calif. says: "The Plant Variety Protection Act does allow small seed companies to protect their investment in research by affording them protection on the varieties they develop and merchandise."

This is because I see you are not acquainted with many of our companies, so I thought I might enlighten you, if I might. Holler and Company, Inc. are from Rocky Ford, Colo. They say: "We sincerely feel that you should heed the advice of plant breeders in this matter."

They are breeders and growers of watermelon, cantaloupe, cucumbers, squash and gourds in Rocky Ford, Colo.

Mr. MOONEY. Have you had more letters from people in favor than those concerned about the legislation?

Mr. DE LA GARZA. Those in favor of the legislation are overwhelmingly more than those that are opposed. We have had just a very few—there is something very interesting. Nine out of 10 letters opposing the legislation were written because of erroneous information or misinformation which we are trying to clear up.

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There was a lady who felt that she would not be able to have a home garden. Then there were people who were told that this make seed prohibitive.

Genuine opposition for special reasons such as yours and others we have heard from today have been very few.

Mr. MOONEY. I have had a number of letters myself. I can sympathize with you and those seed companies who believe innovation is impossible without patents. I think that is equally erroneous.

Mr. DE LA GARZA. You are against patents. That is OK. we will accept——

Mr. MOONEY. The United States is hitching its wagon to a very small star, as well. It is the UPOV Convention. The variety of methods of rewarding plant breeders and the methods also of getting tax subsidies and other approaches to stimulate private sector plant breeding——

Mr. DE LA GARZA. They may or may not do that. That is something that we have to look forward to. Whether they do or they don't, we have Goldsmith Seeds, Inc., Gilroy, Calif.; California Seed Association; Ohio Seeds; West Waterman-Loomis Company; Quality Sales—these are no major transnationals, and with no conspiracy to control. We have Johnny's Selected Seeds from Maine and the Ramsey Seed Company from Monteca, Calif.

Mr. MOONEY. Certainly it would be useful to hear the words of plant breeders on this as well as the seed companies.

Mr. DE LA GARZA. We have many, many breeders——

Mr. MOONEY. Such as Dr. Borlaug in Mexico. I think he would have something to say about this system. He is an American citizen. I think he is a well-regarded plant breeder. He got the Nobel Peace Prize for that work, and he still is opposed to this legislation.

Mr. DE LA GARZA. Who is Dr. Borlaug?

Mr. MOONEY. Dr. Norman Borlaug. He won a Nobel Peace Prize for his work on the Green Revolution. He is opposed to plant breeders' rights and plant patent legislation.

Mr. DE LA GARZA. We worked on the Green Revolution, too, in this committee.

Mr. MOONEY. I think you and he might have a lot to agree upon related to the Green Revolution. His opposition is not to the Green Revolution which he fathered. It is to the kinds of regulations which he perceives plant patents to be, which would restrict his ability to exchange germplasm.

Mr. DE LA GARZA. But this bill has nothing to do with regulations. Philosophically, you say a plant patent is a regulation in itself. But we cannot go back to 200 years ago. Do you think Mr. Gallo will call Mr. Taylor and say he has a new little variety of grape and that it would be good for Mr. Taylor to have some—"Come get a few twigs."

Do you think he would do that?

Mr. MOONEY. I think the distinction is again that the assumption is that UPOV is the be-all and the end-all and the patent system is the means of rewarding all plant breeders and stimulating innovation.

Mr. DE LA GARZA. This is something, even in my own area—a fellow has a new bull that is the beauty of the breed. He does not

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call his neighbor and tell him he has a new bull and that the neighbor should bring his heifers over. They pay for that.

You see movies back in Canada where everyone used to come and chop the wood off the land and make a barn for a fellow whose barn burned down—they don't do that anymore.

And the fellow that came with his seeds—a Johnny Appleseed walking across the plains. We cannot go back to that, and without some form of protection you are back to the law of the jungle.

Mr. MOONEY. Four million people staggered through the jungle as far as 1970 relatively safely, considering all the facts in the world.

I am nor sure that the Plant Variety Protection Act has solved all of those problems. It is also just simply too early to be sure that the Plant Variety Protection Act being 10 years old, and most wheat varieties take longer than that to develop—can be a sign of anything at this stage. It is simply too young to judge fairly, probably, at this point.

Mr. DE LA GARZA. Why would you want to kill it now?

Mr. MOONEY. One question is why kill it? The other question is why extend it when there is no evidence to it?

Mr. DE LA GARZA. All we are extending is six varieties. The gentleman earlier talked about the little peasant out in the desert. Nobody there is going to grow okra.

Mr. MOONEY. I could paraphrase a Canadian experience. We had a Royal Commission. We have a lot of those in Canada. One of our Reyal Commissions on the patent system was happy to quote the U.S. studies on this system. They quoted again Dr. Matchluf in pointing out that if we did not have a patent system today, there would be no logical reason to go about creating one, given what we know about patents and how they operate in the economy today.

However, because we do have a patent system, there is also no logical reason to throw it out, because we don't have the data. I am paraphrasing only slightly here.

They went one step further in Canada and said that since we don't have an extensive system for plant varieties, there is no reason to extend it.

Mr. DE LA GARZA. If you didn't have a patent system, you wouldn't have airplanes, cars, refrigerators, microphones, and so on.

Mr. MOONEY. We somehow ended up with a shopping center——

Mr. DE LA GARZA. Shopping centers you would not have. They are patented.

Mr. MOONEY. They are?

Mr. DE LA GARZA. The companies that——

Mr. MOONEY. I think there is a disagreement there. I think you and Milton Friedman have a dispute on your hands. I do not think shopping centers or any of those kinds of things are. A lot of innovation in our society which is not patented——

Mr. DE LA GARZA. Do you know that there is a company of shopping centers that goes to the community and works through the chamber of commerce and through the communities they say, "We will come in and build a shopping center if you don't let anybody else come in?"

Mr. MOONEY. Sure.

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Mr. DE LA GARZA. That is patented. Not with the Government involvement, but——

Mr. MOONEY. I think there needs to be a clarification of the term "patent" then. It seems to be used rather widely here. That is not my understanding of a patent at all. My understanding of a patent is a very precise government instrument used to do what it would like to do in a certain area of the private sector.

Mr. DE LA GARZA. In the technical, legal aspect, yes.

Mr. MOONEY. I would be concerned if you find that it does extend beyond that in some way to other areas. I think that if that is the case, then you are dealing with a Government regulation which you cannot control.

Mr. DE LA GARZA. The technical aspect of the patent, yes. It is formal.

Mr. MOONEY. That is what it is.

Mr. DE LA GARZA. But being able to protect a property right. A fellow in Montreal of Quebec says, "This is my corner to sell newspapers and nobody else is going to come and sell them in this corner." That becomes a patent. That becomes a property right. Just try and get another newspaper fellow to go to that corner where the one who has been selling papers there for 25 years—do you think he is not going to have a fight on his hands?

Mr. MOONEY. There are two problems with plant patents——

Mr. DE LA GARZA. I may be deviating too far, but back to the property rights. Do you think the fellow who has been at one corner selling newspapers for 25 years is going to allow a newcomer to come and sell at that corner without a fight?

Mr. MOONEY. The real question there is this. He is not in charge of my daily bread. The system that you are talking about now and you are dealing with now is something which deals with the fundamentals of human life which is the seed——

Mr. DE LA GARZA. But this is voluntary. You don't have to.

Mr. MOONEY. That assumes, sir, to a virgin birth and a virgin life for the patent system, that somehow you can create a mechanism like this, which we are being told creates an oligopoly in the marketplace, without having it affect anything else. That is, that somehow it would naively, blithely pass through life and does not rub shoulders with any other kind of agricultural legislation anywhere. I think that is an impossible situation to have.

Obviously this legislation does affect other areas of the agricultural system. Obviously it does have an impact on almost anything else you would care to name related to agriculture.

Mr. DE LA GARZA. Hopefully it will be a positive asset. I think it has been.

Mr. MOONEY. And there is no proof of that.

Mr. DE LA GARZA. Thank you very much. That is what we are trying to document, and certainly you have contributed to it. Mr. Wampler has a question, if you don't mind.

We always welcome our Canadian brethren any time.

Mr. MOONEY. Thank you.

Mr. WAMPLER. Mr. Mooney, if I understand you correctly, you are opposed to plant patents as a means of protecting new plant developments.

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I have here a copy of your book, "Seeds of the Earth, a Public or Private Resource." I look on the third page and this is copyrighted.

Mr. MOONEY. That is right.

Mr. WAMPLER. Can you explain why it is proper to copyright a book to protect your investment and research and not extend that same protection to developers of other products?

Mr. MOONEY. That is called government regulation again. In Canada you cannot actually register a book without having it copyrighted. It is done automatically. Otherwise it cannot be printed.

That may be a unique problem we have in Canada. I do not know what your American situation is. Our second edition of that book, once we discovered that problem, does say on it that it is open to anybody to make use of and they do not have to refer to us.

But I would argue with you rather strongly that if you are making a connection—and I would be concerned about the orientation that you have had—if your are making a suggestion, as much as I value my book, that it is important as seed itself, there are implications on the national economy and the national well-being for a copyright item that are the same as something as vital to life as seed.

Mr. WAMPLER. So you would distinguish between a performing artist, that is to say one who writes a book or composes music, or something like that—he has an absolute property right, but the person who develops a new plant species or variety does not have that right.

Mr. MOONEY. You are dealing with two different things—oranges and apples. The industrial patent system—one of the requirements that makes it distinct from plant rights, for example, is the requirement of an inventive step. It is a tradeoff mechanism. Patents are a straight contractual or bargaining arrangement between somebody who has something and a society that wants something.

Society says, you give it to us and if you show us how you did it, and you show us that inventive step, then we will give you that monopoly position for a period of years.

Unfortunately, with plant varieties, although genius is required by the plant breeder—in New Zealand, for example, they call the legislation "plant selectors' right" because you can simply find something. You can simply discover something, and you don't have to and you can't show an inventive step. So the human rights argument is often used. It is always amazing to me to hear people quote the universal declaration of human rights with such passion, article 27, paragraph 2, which talks about the right of the inventor to control the product of his mind. They do not go on to argue the other part of that same article 27, which is the right of society—the right of society to have access to those innovations. The right of society to have free access, by the way, as it says, freely to have access to those inventions, is there.

Those rights balance out the rights of the individual. No plant breeder or no inventor was born naively into the world without the benefit of all of human history and civilization behind him. Every plant breeder and every inventor knows that, and before we give that person a monopoly on anything, we should be quite sure we

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know what we are getting. We are not getting here an inventive step.

Mr. WAMPLER. I guess you and I are basically in disagreement on our philosophy. I guess it is a part of my reactionary nature, but I happen to feel that a patent is a porperty right.

We had a discussion with some witnesses earlier today, and it just seemed to me that when a person does the basic research that entitles him to a patent, he has an absolute right, and he is entitled to compensation for it. If he chooses to share it, or if he does not, it is his for the term of the patent.

To me that is so fundamental in our constitutional form of government——

Mr. MOONEY. Historically, the opposition to plant patents or any other kind of patents does not come from the left wing of society. It comes from the right wing of society. It comes from those who do not like government intervention in the marketplace in such an artificial way. It comes from, in the last century, those who were in favor of laissez faire capitalism. They come in this century from those, like Milton Friedman, who find it is alien to their sense of the system that they live in.

Mr. WAMPLER. As I say, I think you and I have a fundamental difference here. I respect your theory although I respectfully disagree with it. I think that this is what we are attempting to do, That is, we are attempting to find some way to really identify what the problem is here, if any, and if the objections that are being raised are valid, and if not, so that we can proceed with this legislation.

Mr. MOONEY. We agree that you are positioning yourself to my left, then, in this case?

Mr. DE LA GARZA. Mr. Mooney, Mr. Wampler is to the left of no one. [Laughter.]

In looking on your FAO document, I have a technical problem with that also. I had assumed, or misunderstood you to say, that this was an official FAO document. I find it is a memorandum from a Mr. Walton to a Mr. Hewitt. It is not an official published document of the FAO or any of the subsidiary agencies of the FAO.

Mr. MOONEY. I called it a property right of FAO.

Mr. DE LA GARZA. No, sir, I think probably under our laws it may be the personal property of Mr. Walton. And, with all due respect, it is an office memo from one individual to the other. I had assumed it was, as you stated, a document of FAO. It is not a document of FAO, but rather a personal memo.

Mr. MOONEY. Sir, if you will look at the second paragraph, I think you will find that the basis for the document is there.

Mr. DE LA GARZA. I am just looking at the top. It says: "office memorandum to L. E. Hewitt from Walton." It is dated February 1980, with no other identification relating it to FAO or an official document.

Mr. MOONEY. Would you be willing to accept the same document then as it is written into the Irish Parliament's record?

Mr. DE LA GARZA. With all due respect—I guess if you have a copy of the official publication of the Irish Parliament——

Mr. MOONEY. It will take me a couple of days to get it, but I can get it for you.

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Mr. DE LA GARZA. Really, it is not all that helpful to you. I don't think you have read page 3.

Mr. MOONEY. I did.

Mr. DE LA GARZA. I quote:

It would not seem advisable at this stage to develop an elaborate general policy guidelines regarding FAO–UPOV cooperation and a more flexible ad hoc position should be preferably taken by units in cases of cooperation with UPOV. The details of cooperation of FAO with UPOV in concrete cases should be decided in respective departments and divisions, and you do what you think is best under the circumstances.

Mr. MOONEY. Why not read the first paragraph of the second page?

Mr. DE LA GARZA. But this is the operative paragraph.

Mr. MOONEY. I think the arguments of their concern for UPOV are well documented in the second page. I don't think there would be any doubt as to the position that FAO has on that.

Mr. DE LA GARZA. What the fellow says to the other fellow is that he should do what he thinks is best, if I read the English language correctly.

Thank you very much, sir. We appreciate your testimony

Mr. MOONEY. Thank you.

Mr. DE LA GARZA. Our next witness is Dr. Heribert Mast, vice secretary-general of the International Union for the Protection of New Varieties of Plants, Geneva, Switzerland.

We welcome you, sir, and we open this hearing to you for whatever defense you may wish to make of your organization or answer any of the questions which have arisen during the testimony in regard to your organization.

Maybe if you would also give us a little background on what your aims are, that would be good.

Without objection, your statement will appear in the record and you may proceed as you best see fit.

STATEMENT OF HERIBERT MAST, VICE SECRETARY-GENERAL, INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS, GENEVA, SWITZERLAND

Mr. MAST. Thank you, Mr. Chairman.

My name is Heribert Mast. I am the Vice Secretary of the International Union for the Protection of New Varieties of Plants which I will refer to in my testimony by its French acronym, UPOV.

By way of personal introduction, I have held my office in UPOV for about 6 years. Before that, I was a legal officer in the Federal Republic of Germany's Minister of Justice, competent for the field of patent law.

I was for some years entrusted with the supervision of that country's patent office. I am trained as a judge and served as such for a number of years. I am fairly familiar with the American legal system, having spent a postgraduate year at Duke University Law School in 1952.

UPOV is an intergovernmental organization with its headquarters in Geneva, Switzerland. It is affiliated by an agreement of cooperation with the World Intellectual Property Organization—WIPO—a specialized agency of the United Nations system concerned with protecting patents, trademarks, copyrights, and other

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kinds of intellectual property. The WIPO Director General, Dr. Arpad Bogsch, is also the UPOV Secretary-General. I am his representative.

Dr. Bogsch, by the way an American, hoped to attend this hearing, but previously arranged obligations precluded this.

Mr. Chairman, I would appreciate it if you would give my written statement to the records of this meeting, and I would like to cut short my observations in view of the fact that many of the explanations of what UPOV does were given already this morning.

I would just in the form of summarizing want to say this. UPOV has now 12 member states, to be exact, from May 17 on it will have 12 member states. The last one is Spain.

UPOV is based on an international convention, the UPOV convention. The main obligation for member states under the UPOV convention is the obligation to maintain or to introduce a plant breeders' rights system, to grant plant breeders' rights in the form of patents, or of special certificates.

The UPOV convention tries to harmonize the plant breeders' rights system in the member countries and for this purpose it contains a number of basic rules and a number of basic principles. The basic principles are that a variety is protected or shall be protected when it is truly new and when it is distinctly identifiable from other varieties, when it is homogeneous, and stable. It must be given a variety denomination.

Mr. Chairman, already this morning it was pointed out that the aim of granting plant breeders' rights is, in the first place, to protect the investments and protect the efforts of plant breeders, but, as the UPOV convention states in their preamble, "The ultimate aim is to promote agriculture, horticulture, and forestry by giving an example for plant breeding."

The incentive of granting private plant breeders' rights has at least in the free society proved to be very valuable.

The role of UPOV in this system of plant breeders' rights is to promote international cooperation.

As you know, Mr. Chairman, modern agriculture cannot be contained within national borders. New plant varieties grown and developed in the United States are sold around the world, and foreign varieties are well known in the United States. UPOV's particular aim, and one for which it is uniquely qualified, is facilitating international agricultural trade.

I would like to mention one special feature of the UPOV convention. This is a special feature to safeguard interests of the public and is a requirement that a variety to be protected must be given a denomination. Without some way to identify protected plants easily in the marketplace, consumers would sometimes be confused and would buy the wrong plant. Some of the Convention's value would be lost when this would happen. The Convention, to guard against mistakes or deceit, requires a protected variety to be sold only under the variety name selected by the breeder, whether he or someone else sells it. This is exactly what your State unfair competition and truth-in-labeling laws expect of merchants.

I would like to mention also in detail the special benefits the UPOV Convention assures the breeders of its member states.

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First of all, it assures to breeders in other UPOV member states the enjoyment of national treatment. That means the breeders of other UPOV member states will receive the same beneficial treatment as national of the state enjoy in which an application is filed.

Also, the UPOV Convention grants to breeders of other states the right of priority. UPOV itself publishes guidelines, prepares resolutions and recommendations to be agreed upon by the member states, issues a newsletter, and furnishes all kinds of information about plant breeders' rights, and maintains the necessary contacts with the authorities of member states and international organizations in the field of plant breeding and the seed trade.

Mr. Chairman, we follow a very open information policy, and I was very astonished to hear from my predecessor in this chair that there was little information available about UPOV. We publish a UPOV newsletter four times a year which is unique in the open information it gives to everybody who wants to read it, and we have in our general information brochure at least two pages on which we list the publications of our organization.

Also, I wish to point out at this time that we maintain very close contact to private but also to other intergovernmental organizations, especially in the field and within the United Nations family. I would be very astonished if ever this year a memorandum of some policy would be issued of which we would not know. I must say I do not know of any policy or any guidelines of FAO which has been issued in February of this year.

Mr. Chairman, I have tried in short to explain what UPOV does and for which purposes it does it.

I think, Mr. Chairman, it is as important to say what UPOV does not do, but what it is occasionally and erroneously blamed for doing.

First of all, UPOV does not require its member states to adopt the laws and practices of other member states. Apart from the basic legal requirements prescribod in the UPOV Convention, member states are free to organize their plant breeders' rights according to their own needs and according to their own economical system.

It is true that UPOV follows the aim to harmonize the laws between the UPOV member states, but all the international harmonization we seek is achieved by consent of representatives of member states, after careful preparation and in close contact with the private circles concerned, especially in close contact with the worldwide associations of breeders, seed traders, producers and consumers.

Second, UPOV does not expect or demand national catalog systems for plants. Such systems are completely outside the realm of UPOV, although some of UPOV's members have them. Article 14 of the UPOV convention, in fact, states that breeders' rights must be completely independent of any practices for regulating the production, certification, or marketing of seeds and propagating material.

Everybody in UPOV knows that the United States is opposed to such catalog systems. The U.S. delegation to the 1978 diplomatic conference to revise the UPOV convention could not have been

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clearer on this point, as I can witness as the Secretary-General of that conference.

The United States adamantly stated that it would not adopt any catalog system no matter how useful it may be in Europe.

UPOV will not and cannot compel the United States to outlaw a single variety in the United States. We realize and accept the fact that in your country consumer demand, not also Government administrators, determine which varieties will be available.

Third, UPOV has no effect whatsoever on trade in old or traditional varieties, nor does any national breeders' rights law under the UPOV Convention. This is also, of course, true of your plant patent law and the Plant Variety Protection Act. Anyone is absolutely free to plant, grow and harvest these old varieties without paying royalties to any breeder. Protection only applies to new varieties which the breeders wish to be protected, and then for only a limited time.

Fourth, scientists and plant breeders are absolutely free to use any protected variety for research and evaluation in developing new and better varieties. The Convention, as do your own laws, guarantees the openness of research as well as the further progress of plant breeding. Let me read the relevant section of the Convention on this important point:

> Authorization of the breeder shall not be required for the utilization of the variety as an initial source of variation for the purposes of creating other varieties or for marketing such varieties.

Fifth, UPOV guarantees, as I said before, protection for the breeder of a new variety against piracy by competitors. The breeders may not or could not engage in plant breeding if forced to compete with competitors who have invested nothing in research and may even have capitalized on the breeder's advertising and promotion. UPOV does, on the other hand, not force any breeder to obtain protection, however. All breeders' rights systems are entirely voluntary.

Sixth, a new variety to be protected must, of course, be homogeneous or uniform. Otherwise, farmers and growers and consumers would not be interested in growing it because they could not depend on the crop. This homogeneity within the variety is entirely different from the homogeneity or likeness among commercially grown varieties that is sometimes accused of leading to dangerous genetic uniformity.

By requiring samples of protected varieties to be deposited, the UPOV system incidentally helps assure their conservation and future public availability. Needless to say, neither UPOV nor its member states in any way impair the conservation of genes by public or private gene banks.

Some national experts within or working with UPOV, I might add, are dedicated to germplasm conservation. To mention one example, the present Chairman of the UPOV Council closely cooperates with the Nordic Gene Bank and takes part in international discussions for the promotion of gene conservation within FAO and within the United Nations family.

Most costly measures are taken by the breeders—of course, in the interest of their own work and not, at least not in the first place, in the public interest—for conservation of genetic material.

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Even so, these private collections might be a valuable safeguard against genetic erosion.

UPOV in no way favors the business interests of big or multinational firms at the expense of their smaller competitors, or the acquisition of seed firms by multinational companies. UPOV is completely neutral about corporate strategies. These matters are totally subjected to other legal, business and financial factors. We find among the plant breeders in UPOV member states large and small firms, international firms, national firms of some size, and also individual breeders.

Mr. Chairman, this concludes my testimony. I thank you for the opportunity to speak on UPOV and its functions, and I gladly confess that I feel honored to be allowed to speak in this venerable institution. I know you are concerned here with very complicated issues, and I would be pleased to answer any questions you might have.

Mr. DE LA GARZA. Thank you very much.

Mr. Wampler?

Mr. WAMPLER. Dr. Mast, I want to commend you for a very, very fine statement. I certainly find myself particularly in agreement with the paragraph on page 4 of your prepared statement when you say that legal protection of new varieties is critically needed if plant breeders are to spend their time and money breeding new plants.

It seems to me that a good deal of the testimony today has been directed against our whole system of patents for plant varieties. Now, I realize there is room for honest differences of opinion as to whether we should have patents extending to plant varieties or not, but as you perhaps get it, I feel very strongly that this is a fundamental right and it should be the option of the holder of the patent as to whether or not he wants to put it in the public domain or whether he chooses to protect it as the patent law generally applies to all other things.

I appreciate what you had to say and what your organization apparently has been able to do, at least with your member states, as to try to bring some uniformity in protection and understanding in this whole realm which, of course, is vitally important if we are going to ever be successful in providing the total population of the world with the necessary food and fiber to sustain life.

The experts tell us by the end of this century, and that sounds like it is a millenium but it is not so far away, that we are going to have to find ways to feed people.

I think what your organization is doing, as you have related it to us here this afternoon, and as I understood it prior to today, I think you are to be commended. I hope you will keep up your efforts to try to identify these problems where there is a lack of uniformity or understanding among nations and see if we can't move in a more positive way as you have apparently already begun, and hope that others will become a part of your organization to lessen these tensions and misunderstandings that perhaps do exist.

I commend you for your good work.

Mr. MAST. Thank you very much, sir.

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Mr. DE LA GARZA. Dr. Mast, I see from your testimony that you have an agreement of cooperation with WIPO, the World Intellectual Property Organization. This is, in effect, a branch of the United Nations. Is that not so?

Mr. MAST. Yes, sir. The WIPO is one of the so-called specialized agencies within the U.N. family. Other specialized agencies, as you know, are FAD, UNESCO—these are the two main ones that I might mention. Also the World Postal Union is one of the technical specialized agencies of the United Nations. But UPOV is not a part of the U.N. family. It is only affiliated with WIPO.

Mr. DE LA GARZA. Right. Will you explain the agreement of cooperation that you have with them?

Mr. MAST. The agreement of cooperation is the following. The director-general of WIPO is ex officio the secretary-general of UPOV. For the rest UPOV is independent. It is an independent organization but this statue of UPOV stems from the time when also WIPO was not a member of the U.N. family. WIPO became a specialized agency by special agreement with the United Nations some years ago.

Mr. DE LA GARZA. We thank you very much, sir, and we certainly appreciate your coming to be with us today and to present your testimony in behalf of your organization.

[The prepared statement of Mr. Mast follows:]

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STATEMENT OF
Heribert Mast, Vice Secretary-General of the International Union for the Protection of New Varieties of Plants

BEFORE THE
HOUSE AGRICULTURE SUBCOMMITTEE ON
DEPARTMENT INVESTIGATIONS, OVERSIGHT, AND RESEARCH
ON H.R. 999
APRIL 22, 1980

MR. CHAIRMAN: My name is Heribert Mast. I am the Vice Secretary General of the International Union for the Protection of New Varieties of Plants which I will refer to in my testimony by its French acronym, UPOV.

By way of personal introduction, I now have been the UPOV Vice Secretary-General of UPOV for six years. Before that, I was a legal advisor in the Federal Republic of Germany's Ministry of Justice, specializing in patent law. I was, for some years, entrusted with the supervision of that country's patent office. I am trained as a judge, and served as such for a number of years. I am fairly familiar with the American legal system, having spent a postgraduate year at the Duke University Law School.

UPOV is an intergovernmental organization with its headquarters in Geneva, Switzerland. It is affiliated by an agreement of cooperation with the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations system concerned with protecting patents, trademarks, copyrights and other kinds of intellectual property. The WIPO Director General, Dr. Arpad Bogsch, is also the UPOV Secretary-General. Dr. Bogsch, by the way an American, hoped to attend this hearing, but previously arranged obligations precluded this.

UPOV's domain is the protection of new varieties of plants by the granting of plant breeders' rights, either in form of a patent or a special title of protection or by both as in the United States. Plant breeders' rights can loosely be characterized as follows: the breeder of a new variety is given, if he so requests, for a limited period of time an exclusive right for the commercialization of his variety (that means mainly of the seed or other propagating material of the variety) on the understanding that he renders the plant variety to the public when the term expires. Plant breeders' rights are granted by national government authorities of the UPOV member States and the other States providing such rights without being members of UPOV. In the United States, as you know, the Patent and Trademark Office grants plant patents for asexually

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propagated plants, while the U.S. Plant Varieties Rights Office issued certificates for sexually propagated plants.

In promoting plant breeding and plant breeders' rights on the international level, UPOV performs basically the same functions as WIPO does in encouraging literary and technical creativeness throught promoting patenting and copyrights. UPOV is continually growing. UPOV began in 1961 with a handful of European States. There are now eleven member States, and by May 17 there will be twelve. These twelve are situated on three continents not counting overseas territories of our members on the other continents. All of these States have extensive and highly developed plant breeding and agricultural sectors.

The basis of UPOV is an international convention to which I will refer as the UPOV Convention. The latest text of this Convention of 1978 has been signed by six more States: Canada, the United States, Mexico, Ireland, Japan and New Zealand. Some of these are already on the fringe of joining the Union, making UPOV even more a world-wide organization. This 1978 text of the Convention was developed and was adopted by a Diplomatic Conference to induce the membership of the United States and other states with advanced agricultural economies. It has been amended to meet the special economic needs of these countries.

What are the main contents of the UPOV Convention?

The UPOV Convention obliges each of its member States to provide an adequate national plant breeders' rights system. In the United States, as you know, such a system has long been successfully operating. The Plant Patent Law was enacted in 1930 and the Plant Variety Protection Act in 1970, and these already provide significantly more protection on the national level than the Convention requires as a minimum of its members.

The Convention does more than require the availability of plant breeders' rights: it obliges its members to apply, in their plant breeders' rights legislations, the same basic legal principles. Otherwise, the breeder would be confronted with diverse legal systems in each State, and meaningful protection beyond the borders of his own country might be jeopardized. In other words, besides assuring the granting of plant breeders' rights, the UPOV

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Convention aims at their harmonization, and so does, even beyond the provisions of the Convention, UPOV itself.

To mention in short these basic legal principles:

The plant to be protected must be truly new, distinctly identifiable from other varieties, homogeneous and stable. It must be given a variety denomination, a requirement to which I will come back to later.

Legal protection of new varieties is critically needed if plant breeders are to spend their time and money breeding new plants. Your country's own great inventor, Thomas Edison, once warned, as I was told, against a career in plant breeding unless patents or patent-like rights were available to protect newly developed plants.

The aim of granting such legal protection as the preamble of the UPOV Convention acknowledges, however, not primarily to safeguard the breeder's private interests. It is the enhancement of plant breeding and the public availability of new plant varieties which the Convention strives for. To achieve this, e.g., to make private individuals spend time and money on the breeding of improved plants, and to take the risks involved in this long-term achievement, a strong incentive is needed. The incentive of plant breeders' rights, we know from experience in both UPOV and non-UPOV member States with breeders' rights laws, including your own, has proven itself. As a matter of fact, it is the only truly efficient incentive in a free society. From the encouragement it offers, the public has received a continuous supply of new and better varieties with higher yield, better quality, greater resistance to pests and diseases, and a greater winterhardiness; in short, varieties which meet the needs and desires of the consumers and farmers. No substitute for this incentive has been found.

Modern agriculture cannot be contained within national borders. New plant varieties grown and developed in the United States are sold around the world, and foreign varieties are well-known in the United States. UPOV's particular aim, and one for which it is uniquely qualified, is facilitating international agricultural trade. UPOV has developed into a well-known international forum for the improvement of plant breeding, and its influence and work extends beyond the circle of its member States. Without the availability of legal pro-

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tection in foreign countries, which UPOV helps provide, breeders would hesitate or refuse to export their most valuable varieties. Consumers here and abroad would have no choice but to grow less desirable plants.

Another feature of the UPOV Convention in order to safeguard interests of the public is the requirement that a variety to be protected must be given a denomination. Without some way to identify protected plants easily in the marketplace, consumers would sometimes confusedly buy the wrong plant. Some of the Convention's value is lost when this happens. The Convention, to guard against mistakes or deceit, requires a protected variety to be sold only under the variety name selected by the breeder, whether he or someone else sells it. This is exactly what your State unfair competition and "truth-in-labeling" laws expect of merchants.

What other benefits does the UPOV Convention assure to breeders through promoting and harmonizing the system of legal protection?

First of all, it assures that breeders of other UPOV member States enjoy national treatment, that means the same beneficial treatment as the nationals of the granting State enjoy, it guarantees to breeders of other member States a right of priority for their applications for protection. UPOV itself publishes guidelines, prepares resolutions and recommendations to be agreed upon by the member States, issues a newsletter and furnishes all kinds of information about plant breeders rights and maintains the necessary contacts with the authorities of member States and international organizations in the field of plant breeding and the seed trade. UPOV always tries to remove unnecessary bureaucratic and other barriers for breeders seeking domestic and foreign protection. Last not least, UPOV tries to harmonize laws and practices in the field plant breeders' rights, thereby encouraging the transfer of technology of new varieties from country to country.

UPOV consists of a number of organs. There is the Office or Secretariat of UPOV, there is a supervisory organ consisting of representatives of member States called Council which meets once in a year, there are committees of experts in the field, an Administrative and Legal Committee, a Technical Committee and there are five Technical Working Parties or groups, specialized in the various crops. It is one of the tasks of my office to organize meetings of all of these organs.

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I have tried to explain in short what UPOV does and why it does it. It is just as important to explain what UPOV does not do, but is occasionally erroneously blamed for doing. UPOV does not require its member States to adopt the laws and practices of other member States. Apart from the basic legal requirements prescribed in the UPOV Convention, member States are free to organize their needs and economy. All the international harmonization we seek to achieve is done by consent of representatives of member States, after careful preparation and in close contact with the private circles concerned, especially the worldwide associations of breeders, traders, producers and consumers.

UPOV does not expect or demand national catalogue systems for plants. Such systems are completely outside the realm of UPOV, although some of UPOV's members have them. Article 14 of the UPOV Convention, in fact, states that breeders' rights must be completely independent of any practices or measures for regulating the production, certification or marketing of seeds and propagating material. Everybody in UPOV knows that the United States is opposed to such catalogue systems. The United States Delegation at the 1978 Diplomatic Conference to revise the UPOV Convention could not have been clearer on this point as I can witness as the Secretary-General of the Conference. The United States adamantly stated that it would not adopt any cataloguing system, no matter how useful it may be in Europe. UPOV will not and cannot compel the United States to outlaw a single variety in the United States. We realize and accept the fact that in your country consumer demand, not government administrators, determines which varieties will be available.

UPOV has no effect whatsoever on trade in old or traditional varieties, nor does any national breeders' rights law under the UPOV Convention. This is also, of course, true of your plant patent law and the Plant Variety Protection Act. Anyone is absolutely free to plant, grow and harvest these old varieties without paying royalties to any breeder. Protection only applies to new varieties which the breeders wish to be protected, and then for only a limited time.

Also, scientists and plant breeders are absolutely free to use any protected variety for research and evaluation in developing new and better varieties. The Convention as your own laws guarantee the openness of research as well as the further progress of plant breeding. Let me read the relevent

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section of the Convention on this important point: "Authorization of the breeder shall not be required for the utilization of the variety as an initial source of variation for the purposes of creating other varieties or for marketing such varieties."

UPOV guarantees, as I said before, protection for the breeder of a new variety against piracy by competitors. The breeders may not or could not engage in plant breeding if forced to compete with competitors who have invested nothing in research and may even have capitalized on the breeder's advertising and promotion. UPOV does not force any breeder to obtain protection, however. All breeders' rights systems are entirely voluntary.

A new variety, to be protected, must of course be homogeneous or uniform. Otherwise, farmers and growers would not be interested in growing it because they could not depend on the crop. This homogeneity within the variety is entirely different from the homogeneity or likeliness among commercially grown varieties that is sometimes accused of leading to dangerous genetic uniformity.

By requiring samples of protected varieties to be deposited, the UPOV system incidentally helps assure their conservation and future public availability. Needless to say, neither UPOV nor its member States in any way impair the conservation of genes by public or private gene banks. Some national experts within or working with UPOV, I might add, are dedicated to germplasm conservation. The Chairman of the UPOV Council, for instance, closely cooperates with the Nordic Gene Bank and takes part in international discussion for the promotion of gene conservation. Most costly measures are taken by the breeders -- of course, in the interest of their own work and not (at least not in the first place) in the public interest -- for conservation of genetic material. Even so, these collections might be a valuable safeguard against genetic erosion.

UPOV in no way favors the business interests of big or multinational firms at the expense of their smaller competitors, or the acquisition of seed firms by multinational companies. UPOV is completely neutral about corporate strategies. These matters are totally subjected to other legal, business and financial factors. We find among the plant breeders in UPOV member States large and small firms, international firms, national firms of some size, and also individual breeders.

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Mr. DE LA GARZA. The next witness is Dr. Charles Lewis of Bryan, Tex.

Mr. LEWIS. Thank you. This is my second appearance today, and this time I am really representing myself.

Mr. DE LA GARZA. Please proceed as you see fit, Dr. Lewis.

STATEMENT OF CHARLES F. LEWIS, BRYAN, TEX., FORMER STAFF SCIENTIST FOR PLANT GENETICS AND BREEDING, U.S. DEPARTMENT OF AGRICULTURE, FORMER EXECUTIVE SECRETARY, NATIONAL PLANT GENETICS RESOURCES BOARD

Mr. LEWIS. My name is Charles F. Lewis. I retired from the U.S. Department of Agriculture in June 1979.

At the time of my retirement I was the national program staff scientist for plant genetics and breeding, located at Beltsville, Md.

I was involved in the planning of the national plant germplasm system and was the leader of a special research project on genetic vulnerability. I participated in the writing of two National Academy of Sciences reports, Genetic Vulnerability of Major Crops, and Conservation of Germplasm Resources—An Imperative. I was the Executive Secretary of the National Plant Genetics Resources Board, appointed by Secretary Butz and continued by Secretary Bergland.

Mr. Chairman, you have my written testimony with an attachment. So much testimony has been given already and so many questions raised that I would depart considerably from my prepared testimony and give you some highlights of my thinking.

Mr. WAMPLER [acting chairman]. Dr. Lewis, your statement will appear in the record in its entirety. The plant genetic resources will be in the committee file. We certainly consider it a highly valuable source of material. It will be made a part of our files.

Mr. LEWIS. Thank you.

The Plant Variety Protection Act was passed primarily to give developers of novel varieties exclusive rights to their varieties for 17 years. Plant breeding is expensive, if it is done properly. It requires land, buildings, seed processing equipment, storage space, and just generally involves hiring some highly trained employees.

Moreover, plant breeding is slow, It may take 15 or 20 years, or even longer, from the time the first cross is made until a variety is ready to release. Breeders who put this much time and money into developing a better product ought to have the right to market it for a while and stand some chance of recovering their investment.

When this act was first passed, six vegetable varieties were exempted. As I understand it, this was a political compromise and the people who objected to their inclusion in the original act no longer have those objections. Therefore, I would favor passage of the amendments to the Plant Variety Protection Act contained in your proposed legislation.

I read the testimonies presented to this committee in July, and I have heard the testimonies so far today. It has been implied that passage of this act and its extension would have an adverse effect on the genetic vulnerability of crops and the conservation of germplasm.

I believe that among the forces tending to cause genetic uniformity and the loss of germplasm that the influence of plant variety

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protection is negligible, and the addition of the six vegetables would be of no importance.

This is not just a personal opinion. Thinking on how to cope with these problems finds its best expression in the two National Academy of Sciences reports and in the "Plant Genetic Resources: Conservation and Use," submitted to the Secretary of Agriculture. Just a word about these documents.

The first National Academy of Sciences report issued in 1972 concludes, and I will quote, "vulnerability stems from genetic uniformity, and some American crops are on this basis highly vulnerable. This disturbing uniformity is not due to chance alone. The forces that produced it are powerful and they are varied."

I would like to stress that the forces are varied.

The report goes on to stress that consumers and processors demand uniformity in the marketplace. For example, the grocery shopper will choose fruit from a uniform display instead of one from one that contains a motley assortment of colors, sizes, shapes, and tastes. The housewife expects canned goods with the same label to be alike from one can to the other and from one time of grocery shopping to the next.

Mechanized agriculture requires a high degree of uniformity for efficient crop production. For example, if combines are used to harvest wheat, then the wheat plants need to be very nearly the same height, and they all need to mature at about the same time. Maturity date would be true, if you were going to harvest it with the old-fashioned scythe.

The second National Academy of Sciences report, "Conservation of Germplasm Resources—An Imperative," concludes that a diversity of germplasm is an essential national resource and that action must be taken to protect and maintain genetically diverse material "because once it is lost, much of it can never be recovered." I have a word about this report.

This report contains recommendations from an outstanding group of leaders from land-grant universities and nonland-grant universities, from private industry, the U.S. Department of Agriculture, and the Rockefeller Foundation. Members of this board were knowledgeable about crop breeding, about genetic resource conservation, and the risks of genetic vulnerability.

Time will not allow me to give you even a summary of this report, but suffice it to say that the need to collect, preserve, evaluate, document, and distribute plant genetic resources is universally recognized, not just by this board and the National Academy of Sciences, but by naturalists and international groups as well. And, I think, by every speaker that has been at this hearing today.

I think it is equally self-evident that the farmers in this country and around the world need to have a dependable supply of high-quality planting seed with the genetic potential for producing high yields of products of good quality, even to the point of resisting as much as possible insects and diseases, and other environmental stresses.

Now let me say a few extra words about the conservation of germplasm.

Most germplasm is maintained in nature according to the law of the survival of the fittest. It is just out there on the landscape.

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Nobody is particularly taking care of it. These are mostly noncultivated plants but may include wild relatives of our cultivated forms.

The second category is what we call "folk varieties." These are plants cultivated generally by small farmers in the lesser developed countries where modern, professionally bred varieties are not used extensively.

The third category are collections of germplasm assembled by private industry, by research scientists and public institutions, or naturalists or hobbyists.

In these three methods of conserving plant genetic resources, there is no fixed responsibility for it and there is no way to administer its continuation. there is no inventory of it. There is no information system about it that you can query. Access to the material is uncertain because who knows who is keeping what where? Funding is usually inadequate and history has shown that these methods are extremely likely to lose the germplasm. the holders of such materials are free to discard all or part of it at their own discretion.

The U.S. Department of Agriculture and the State experimental stations early in the history of this country recognized that these three natural methods should not be trusted for the safekeeping of genetic resources needed now and in the future.

So we come to the fourth method of keeping permanent collections. That is to have collections maintained in the public interest interest by agencies of government. The current system for the United States is a coordinated network of institutions at agencies—some Federal, some State, some private—working cooperatively to maintain our genetic resources.

In contrast to the first three methods, this system—this format system—is characterized by fixed and assigned authority of responsibility for the maintenance of the germplasm in the public interest. The curators do not have the discretion of abandoning the collections or discarding the material unilaterally.

The second feature is that a funding plan can be administered to units of the systems.

Third, and most important, a computer-assisted information storage and retrieval program is being developed so that the user of this material can quickly find out where the material that he might need is being held.

Another important feature is that all materials in this system are made available, free of charge, to any genetics and plant breeder who may need to use it. And since it is a national scheme, it can officially cooperate with other national and international groups.

Those of us who have tried to develop and strengthen this system know of its strengths and weaknesses. It is not a perfect system, and it has not accomplished all that it should. Yet it is a good system, and I can tell you that it is the envy of many other nations and of other groups in this country that want to preserve other kinds of germplasm.

It is the custodian of hundreds of thousands of seed samples, and each year at planting time it is available to research people in this country and around the world.

In my opinion, this system needs strengthening and support. It underlines the fact that the need to conserve germplasm is not a

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new idea. It has been a policy of this Government since colonial days, and as a nation we can take a good deal of credit for our contribution to our Nation and to the world in this task.

The final point on that is that the need to conserve germplasm is not related in any important way to the plant variety protection legislation. The need will continue, and the plans for doing it will remain about the same regardless of what you do about this bill.

A final word about genetic vulnerability which has been mentioned several times today—all plants are vulnerable to some degree from attack by insects and diseases. Each year pests take their toll; however genetic vulnerability is usually reserved to describe an epidemic loss such as happened in the corn blight epidemic of 1970 or the Irish potato famine back in the 1940's.

Genetic vulnerability and epidemics are not a new phenomenon. They are as old as biblical times. The reports of the National Academy stress that genetic uniformity does not assure that an epidemic will occur. Genetic diversity does not guarantee immunity from epidemic losses. It is true that the probability of epidemic is probably greater in uniform crops than in diverse ones. There is no way to reduce genetic vulnerability to zero.

The basic argument of the board is that genetic diversity within and among varieties planted is not in itself an adequate solution to this problem. It is probably not even the best approach to it.

Farmers in the United States and abroad are not willing, and they should not be expected, to plant inferior seeds and make a personal sacrifice in low productivity as a contribution toward preventing some unpredictable and in any case rare event. I would hate to argue with a Third World farmer or with an advanced world farmer that he should plant inferior seed and make a low production and low income as a public contribution toward the future good of the Earth. I think that he would not be willing to make that sacrifice.

The best place, in my opinion, to have genetic diversity is in the national and international germplasm programs and in the breeding programs of all who engage in developing varieties.

Look back at the corn blight epidemic. Corn is a well-researched crop. It is served by State and Federal research agencies and it is supported by a vigorous private industry. When that epidemic occurred, these people had the genetic reserves in their breeding programs to solve that. That problem was solved within 1 year.

Contrast that with what happened with the chestnut blight and the current disease that is wiping out the dutch elm trees. These are not corporate bred species out there that are inherently uniform. They are whatever nature put there. Yet, that diversity is not enough to protect them. Because we do not know or have a research program on these species, we do not know how to stop that.

So my point is this: Vulnerability is related not so much to uniformity as genetic diversity and know-how in the backup material in the breeding programs.

I would like to make a concluding comment about some remarks that have been made that plant variety protection creates a monopoly and reduces competition. It is true that the holder of that protection certificate has exclusive rights to market that individual

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variety, but in my experience in looking across this Nation, the competition between varieties, protected and unprotected, is pretty fierce.

Just because you have a protection certificate, it doesn't shield you from competition from other people who have a different variety to offer for sale.

It has also been suggested that somehow the protection certificate locks up for the owner the germplasm. As a matter of fact, it does not protect the original parental material that may have gone into the original cross, nor does it even protect the variety itself. The base material as well as the new variety are all freely available to other research people.

I would agree with Mr. Mooney to this extent. If you are going to breed for uniqueness for its own sake, that this is probably a bad trend. But if you breed a new variety that is worth anything, it should have a uniqueness to start with rather than you having to spend extra years putting on a trick character to set it apart.

Mr. Chairman, I lived in this area for 21 years. I appreciate the opportunity to come back into Washington in the spring to testify on some issues that I feel very deeply about.

If there are any questions you might have, I would be glad to answer them.

Thank you.

Mr. WAMPLER. Dr. Lewis, we want to thank you for appearing here in your dual roles today. We are very grateful, for especially your letter presentation, since that did reflect your experience and your observations and not speaking for another who could not be here.

I have one question I would like to ask you, Dr. Lewis. In your past experience with USDA, and germplasm research, I assume you were involved at one time or another with the Fort Collins seed storage facility. Some witnesses today have alluded to that—Fort Collins, that is.

What is you opinion of this facility and some of the criticisms that it has received?

Mr. LEWIS. When Fort Collins was built—in 1958, I think—that represented the best thinking at the time as to where such a facility should be built, and it was designed with the best air-conditioning and humidity control devices that were on the market at the time. I guess that is something like 21 years ago.

As Dr. Jones pointed out, the facility has served its function very well. The seeds put in there at the beginning are still there and still viable. It is filling up rather rapidly, and the machinery is getting a little creaky. The last time I was there it occurred to me that the laboratory will probably be full and obsolete in about 8 years from now. So, I think it is time, Mr. Chairman, that you might start thinking about a new Fort Collins, 8 or 10 years down the road, at which time you might consider a safer location. If you want to put it in a salt mine or a cave someplace for additional security, that would be well and good. But I think that the temperature and humidity control technology will be far advanced then than what is was in 1958.

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It has already been shown that liquid nitrogen is a plausible way to maintain seeds, and other technology for long-term storage will be available at that time.

I would like to make this point. You could blow up Fort Collins and destroy every seed out there, and we would still not be out of business in the United States. Our system has a redundancy in it. Virtually every sample in Fort Collins is held somewhere else in our system, so it is not likely that even in an atomic attack or some sort of a fire that we would be wiped out of our germplasm resources.

Mr. WAMPLER. I thank you very much, Mr. Lewis. We thank you for taking time to come and share your vast knowledge with us.

Let me assure you, speaking for myself, I have been determined for some time about the Fort Collins facility. I know it has served us well and probably still is. But, as you have pointed out, it is something this committee needs to be thinking about looking down the pike, and it is not too far away. I think this is an essential function, and indeed, if we are going to have a seed storage facility, it ought to reflect the latest technology and the best ways that the state-of-the-art can tell us to serve our seeds and germplasm in the way that we want it done.

Mr. LEWIS. With your permission, I would like to add one more thought.

Mr. WAMPLER. Certainly.

Mr. LEWIS. It has been suggested several times today that you should not act on this amendment until further studies are conducted. It would be my view that we have had studies, on top of studies, on top of studies already. These have been by the National Academy, the Plant and Genetics Resources Board, of the International Board; the Crop Sciences Society has had more than one symposium on this subject. Universities have sponsored symposiums on this subject. Individuals have done them. So I am not sure you are going to hear anything new if you have additional studies. I think it has just about all been said. Instead of studying things, I think it is time for action on some of these germplasm and genetic vulnerability problems.

Mr. WAMPLER. I appreciate your observation.

Thank you, Dr. Lewis.

[The prepared statement of Dr. Lewis follows:]

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STATEMENT OF

Charles F. Lewis, U.S. Department of Agriculture (Retired)

BEFORE THE
HOUSE AGRICULTURE SUBCOMMITTEE ON
DEPARTMENT INVESTIGATIONS, OVERSIGHT, AND RESEARCH
ON H.R. 999
APRIL 22, 1980

MR. CHAIRMAN: My name is Charles F. Lewis. I retired from the U.S. Department of Agriculture in June, 1979. I was Staff Scientist for plant genetics and breeding. I was involved in planning the National Plant Germplasm System and was the leader of a special project on genetic vulnerability. I participated in the writing of two National Academy of Sciences reports, "Genetic Vulnerability of Major Crops," and "Conservation of Germplasm Resources--An Imperative." I was the Executive Secretary of the National Plant Genetic Resources Board, appointed by Secretary Butz and continued by Secretary Bergland.

The Plant Variety Protection Act, PL-577, was passed primarily to give developers of novel varieties exclusive rights to their varieties for 17 years. Plant breeding is expensive, if conducted properly. It requires land, buildings, seed processing equipment, storage space, and some highly trained employees. Costs range up to $500,000 per variety, according to some estimates. Moreover, plant breeding is slow. It may take 15-20 years from first cross to the release of a variety. Breeders who put this much time and money into developing a better product ought to have the right to market it for a while and stand some chance of recovering their investment. The Act was based on this fairness principle and with the thought that American agriculture would be best served by stimulating vigorous plant breeding efforts, particularly by industry.

When the act was passed, six vegetables were exempted. As I understand it, this was a political compromise. The need for

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exemption no longer exists. Therefore, I favor passage of the amendments to the Plant Variety Protection Act.

Earlier testimony before this committee implied that PL 91-577, the Plant Variety Protection Act, and, even more specifically, the amendment to delete Section 144 , would have an adverse effect on the genetic vulnerability of crops and the conservation of germplasm. I believe that among the forces tending to cause genetic uniformity and the loss of germplasm resources PL-577 is negligible, and removing the exemption of six vegetables would be of no importance. This is not just a personal opinion. Thinking on how to cope with these problems finds its best expression in two National Academy of Sciences reports and in "Plant Genetic Resources: Conservation and Use," a report submitted to the Secretary of Agriculture in 1979 by the National Plant Genetic Resources Board.

The first National Academy of Sciences report, "Genetic Vulnerability of Major Crops," issued in 1972, concludes that "vulnerability stems from genetic uniformity, and some American crops are on this basis highly vulnerable. This disturbing uniformity is not due to chance alone. The forces that produced it are powerful and they are varied." The report stresses that consumers and processors demand uniformity in the market place. For example, the grocery shopper will choose fruit from a uniform display instead of from one that contains a motley assortment of colors, sizes, shapes, and tastes. The housewife expects canned goods with the same label to be alike from one time of purchase to the next. Mechanized agriculture requires a high degree of uniformity for efficient crop production. For example, if combines are used to harvest wheat, then the wheat plants need to be very nearly the same height, and they all need to mature at about the same time. Seed certification programs emphasize the importance of uniformity and genetic purity, particularly in self-pollinated crops.

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The second National Academy of Sciences report, "Conservation of Germplasm Resources--An Imperative," issued in 1978, concludes that a diversity of germplasm is an essential national resource and that action must be taken to protect and maintain genetically diverse materials "because once lost, much of it can never be recovered." The section of the report on "Findings and Recommendations" lists 14 specific recommendations for the economically important organisms.

The report of the National Plant Genetic Resources Board to the Secretary of Agriculture in 1979 contains the recommendations of an outstanding group of leaders from land grant and non-land grant universities, from private industry, from the U.S. Department of Agriculture, and from the Rockefeller Foundation. Members of this Board are knowledgeable about crop breeding, plant genetic resource conservation, and the risks of genetic vulnerability. Mr. Chairman, I would like to submit the Board's report, "Plant Genetic Resources: Conservation and Use," as an attachment to my statement.

Time does not allow even a summary of this report. Suffice it to say that the need to collect, preserve, evaluate, document, and distribute plant genetic resources is universally recognized, not only by the National Plant Genetic Resources Board and the National Academy of Sciences, but by naturalists and international groups as well. It is self-evident that the farmers in this country and around the world need to have a dependable supply of high quality planting seed with the genetic potential for producing high yields of products of good quality, even to the point of resisting insects and diseases, as well as resisting, as much as possible, cold, drought, heat, salt, and other environmental stresses. Differences of opinion would likely be confined to details of how these objectives can best be achieved.

The conservation of plant genetic resources is accomplished in four ways: (1) Most are maintained in nature, according to

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the "survival of the fittest" principle. These are mostly non-cultivated plants, including wild relatives of the cultivated forms. (2) Folk varieties are plants cultivated generally by small farmers in lesser developed countries where modern, professionally bred varieties are not used extensively. (3) Collections are assembled by private corporations, public research scientists, and individuals. In these three methods of conserving plant genetic resources, there is no fixed responsibility for it and no way to administer its continuation. There is no inventory or information system about it; access to the material is not certain; funding is usually inadequate; and material is extremely vulnerable to loss. The holders of such materials are free to discard all or part of it at their own discretion.

The U.S. Department of Agriculture and the State Agricultural Experiment Stations early in the history of this country recognized that these three methods should not be trusted for the safe-keeping of genetic resources needed now and in the future. The fourth method of conservation is to have permanent collections maintained in the public interests by governments. A brief history of the formal system for the United States is contained in a pamphlet "The National Plant Germplasm System." The pamphlet explains the current version of the U.S. system. It is a coordinated network of institutions and agencies (State, Federal, and private) working cooperatively to introduce, maintain, evaluate, document, and distribute germplasm. In contrast to the first three methods, this system is characterized by (1) fixed responsibility for maintaining germplasm in the public interest. The curators do not have the discretion of abandoning collections or discarding material unilaterally; (2) a funding plan administered to units of the systems; (3) a computer-assisted information storage and retrieval program; (4) the free availability of all materials to all bona fide scientists and plant breeders; (4) cooperation with other national and international agencies.

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Those of us who have tried to develop and strengthen this system know of its strengths and weaknesses. It is not a perfect system; it has not accomplished all that it should. Yet it is a good system that is the envy of many other nations and groups within the United States. It is the custodian of thousands of samples of seeds. Each year it makes thousands of samples available to workers in this country and around the world. The system deserves strengthening and support. I want to stress that the conservation of plant genetic resources is not a new idea. It has been a policy of this government since colonial days, and as a nation we have contributed greatly to our national and to the world effort in this task.

The need to conserve germplasm is not related in any important way to plant variety protection legislation. The need will continue regardless of what is done with this legislation.

All plants are vulnerable in some degree to the attack of insects and diseases. Each year pests take their toll; however, genetic vulnerability is usually thought to refer to epidemic losses, such as the corn blight epidemic in 1970, the current dying of Dutch elm trees, the Irish potato famine of the 1840's, and other historical epidemics as old as biblical times. Genetic vulnerability is not a modern phenomenum. The reports cited earlier stress that genetic uniformity does not assure that an epidemic will occur, and genetic diversity does not guarantee immunity from epidemic losses. It is true that the probability of an epidemic is higher with genetically uniform crops than with genetically diverse ones. No way exists to reduce genetic vulnerability to zero. Genetic diversity among and within varieties planted, in my opinion, is not the best approach to this problem. Farmers in the United States and abroad are not willing, and should not be expected, to plant inferior seeds and make a personal sacrifice in low productivity as a contribution toward preventing an unpredictable and rare event. The best

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place to have genetic diversity is in the national and international germplasm programs and in the breeding programs of all who engage in developing varieties. This approach is clearly presented in the report to the Secretary of Agriculture by the National Plant Genetic Resources Board. The report describes seven phases of work that preserves germplasm and uses it to develop improved varieties which continue to contribute to spectacular gains in agricultural production.

These seven phases are, briefly:

(1) Conserving plant genetic resources;

(2) Studying basic taxonomic and cytological relationships;

(3) Looking for specific desirable characters;

(4) Investigating inheritance of characters;

(5) Developing combinations of characters into improved strains;

(6) Breeding improved varieties;

(7) Increasing and distributing high-quality planting seed.

The National Plant Genetic Resources Board did not view the participation of private industry in this program as undesirable. On the contrary, this seven-phased program, as conducted in the United States, represents a splendid example of the federal government, state governments, and industry sharing a work load so that the best interests of agriculture are served.

If the best defense against genetic vulnerability rests with vigorous plant breeding programs carrying out all phases, then the Plant Variety Protection Act by stimulating breeding has tended to reduce genetic vulnerability.

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Mr. WAMPLER. Our next witness is Dr. Billy E. Caldwell, head of the Crop Sciences Department of North Carolina State University, Raleigh, N.C. He is also president of the Crop Sciences Society of America.

Dr. Caldwell, we appreciate your patience in waiting so long to testify. We are very grateful for your coming here today, and we will be happy to hear what you have to say.

Please proceed as you wish.

STATEMENT OF DR. BILLY E. CALDWELL, CROP SCIENCE DEPARTMENT, NORTH CAROLINA STATE UNIVERSITY, RALEIGH, N.C., AND PRESIDENT, CROP SCIENCE SOCIETY OF AMERICA

Mr. CALDWELL. Thank you, Mr. Chairman.

I realize that time is moving and my colleague, Dr. Lewis has spoken so well of this, I am hesitant to try to add very much to this.

However, I do think there are a few points that I would like to make that I think have not been made today that is important to the issue at hand.

I would like for you to accept my statement as submitted, and I will vary from it a little bit in the essence of time.

My name is Billy Caldwell of Raleigh, N.C. I am head of the Crop Science Department, North Carolina State University, and president of the Crop Science Society of America.

I have served in many roles over the years, primarily in the area of oilseed crops and soybeans and many of my comments will reflect these experiences and the experiences I see in these particular commodities.

I would also like to establish that I am also a plant breeder, having served in this role prior to moving into administration in the area of soybean breeding and genetics.

I am very pleased to have the opportunity to appear before this committee in support of this Plant Variety Protection Act and the proposed amendments to the act. The act has benefited the grower and consumer through improved varieties that have better quality, are more productive, and contain resistance to an ever-increasing number of pests that attack our crops. The need for the future will be even greater as new races or strains of pests evolve. Resistant varieties also will be a major component of the new and emerging Integrated Pest Management concept or its alternate, which I think will be called integrated crop management.

The users of advanced technology such as new varieties often fail to recognize that unlocking nature's biological secrets become progressively more difficult. Through the Plant Variety Protection Act the plant breeder can protect his product and reap the rewards of his efforts. This is true regardless of how or where he is employed. What is not protected is the new genetic combination that may have evolved.

Since other breeders can use protected varieties as a breeding stock, new unique combinations of one breeder can be combined to produce even better combinations. Therefore, nothing is locked up and no life is patented. The unique feature of the Plant Variety Protection Act provides for an open use of genetic material. Only the immediate product, the variety, is protected.

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We have heard talk of monopoly. As a plant breeder, I think I welcome first the challenge that exists with other breeders. I think there is a mutual understanding among plant breeders across the country that this challenge leads to creativity and that no breeder is afrraid of being locked up as long as he has the opportunity to use other plant genetic material that arises from plant breeding programs.

In essence, what we are doing, Mr. Chairman, is building. What one plant breeder does becomes available to the other to incorporate that that he has in his program in a building block to even better and more successful varieties.

The concept of placing traditional varieties with new, more vulnerable varieties also needs a closer look. Most of our crop plants were introduced from other countries. Initially they did well. However, it was not long before pest from the original country and pest of the new world became a problem for these new varieties.

Therefore, it is necessary to select or develop new resistance selections or varieties and production practice in order to grow fruit and seed. As these crops become established, so did the pest. New varieties then needed to be developed.

However, we must recognize that on the other side of genetic durability is pest durability. As new varieties evolve, so does the pest. So the old traditional varieties became obsolete primarily because they cannot be grown and would not survive to produce new crops. Therefore, to believe that traditional varieties could have survived and produced crops is without scientific or logical basis. In addition, much of the germplasm was poorly adapted or of unacceptable quality with low yields.

Again, I refer to the Integrated Pest Management concept that is emerging and many diseases and pests that we have seen.

My first project, Mr. Chairman, was to develop a soybean system and nematode resistant varieties, or to study genetics. In my simplistic way I approached this and found one genetic trait—one race. Now they are talking about multiple resistance and multiple races. Therefore the need becomes greater to unlock the secrets of resistance in incorporating combinations of resistance.

Also during the past 100 years plant breeding has moved from an art to a science. Many of the beginning plant breeders and the early plant breeders and even those just before me were part agronomist and part geneticist. Their job was to develop varieties and also to adapt them.

I think back in soybeans when soybeans were first introduced in this country and they were grown in Pennsylvania. The report from Pennsylvania said that soybeans would never be grown in the United States.

The insight of a Mr. W. J. Morse in his experiments at Arlington Farm, which is now the site of the Pentagon, indicated that, yes, they could be grown. They were viney and many had black seeds. They did not produce well. They were susceptible to many diseases. But through the innovation and creativity of Mr. Morse and some of the early coworkers, yellow seed selections were found. These were then found to be adaptable to the Midwest, and then they were reselected and breeding began. The art became a science.

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Then came World War II and the demand for vegetable oil and soybeans were thrust into the situation as a major commodity in this country. It has continued to be a major commodity both for United States and world consumption.

Then as we moved on into the generations we then required a wide range of varieties to be selected. Southern areas needed to grow soybeans. The diseases were different at that time in the South and resistant varieties needed to be developed.

We need to know better methods of selecting. During the time when oil is very important, as it is today, we need to know how to increase the oil content. We need to know the genetics and maturity in lodging. We need to find ways of understanding the physiology of the plant, the pathology, the soils, and the chemistry. This caused the enlistment of other breeders and geneticists. The challenge was met and soybean varieties now exist that were adapted from Canada to Florida, or to Louisiana. Old varieties that came in early—many of them still exist in germplasm centers, not only at Fort Collins, but in Illinois and Mississippi.

The Plant Variety Protection Act has provided an opportunity for the soybean breeding effort to expand. The additional of about 35 private plant breeders in soybeans has provided the flexibilty to use some of the additional public resources to pursue in-depth studies of the physiology of the plant and investigate the pests that attack soybeans.

Currently, the number of soybean breeders in proportion to the total number of scientists on soybeans is less than it was in 1967 when I assumed responsibility for soybean investigations. Without this influx and input of private industry we would be in a very difficult situation at this time.

I want to say that we sometimes today seem to forget that public agencies are still in business and breeding plant varieties.

We have focused on private plant breeding. As I talk to my colleagues and fellow plant breeders across the United States, I find that they still plan to be developing varieties in the future. It is important that we have strong public supported breeding programs. Where else are we going to find the plant breeders of the future?

Some of these programs may have changed slightly. We have got to have germplasm. With the resource base that we have on most of our campuses, we can create combinations of multiple pest resistance, improved oil quality, and other characteristics that are very vital to the improvement and the stability of the industry, not only in soybeans, but in other commodities, in the future.

We need to move on to the next stage. We need to improve the quality of the oil or oilseed crop and improve its shelf life and make it more usable regardless of who uses it.

We need to begin looking at the protein components. We know about the liasene in corn, but what about the methionine in soybeans, or other oilseed crops that have protein that are very important.

Another area that we need to think about is the mutual interdependence that exists between private and public breeders. We talked about secrecy, and we talked about keeping things from one another.

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I can assure you, Mr. Chairman, that at least in the soybeans and the peanuts and some of the oilseed groups that I work with, there is a mutual independence and understanding. Public and private plant breeders work together in joint work groups. They share the information that is needed to increase soybean yield. Surely we don't exchange all current varieties or the hottest things in each other's programs, but surely there is a sharing of concepts such as the number of races of diseases and the number of nematode races, and availability of resistance. Those things are vital to the survival of this agriculture in this country.

Public plant breeders will be releasing varieties in the future. They will also release germplasm. Germplasm when it is released by public agencies does not go to one individual. It is released by the scientist because that is on way he can get his recognition. It is also a mechanism of making it available to everyone regardless of his role in plant breeding. Therefore, the cooperation between public and private plant breeders leads to increased genetic diversity, better varieties—not less genetic diversity.

I also indicated that one of the roles of the agency is the training of plant breeders. These relationships continue after graduation of a graduate student, and he begins work in a private company. This increases the respect and mutual trust. It does not lessen competition.

I always wanted to be better than my major professor. I wanted to have a variety that exceeded his. But I always respected him and sought his counsel, and shared with him procedures and mechanisms that were involved.

We have heard today also about world centers and their role and how they approach plant variety protection. I can only share with you that I think that these international institutions also have a role that we have not mentioned and that is the conservation of germplasm. Each of these centers either has, because of its geographic location or because of its charter the role to collect and maintain germplasm.

In North Carolina State we work very closely with ICRISAT which is located in India. They have the responsibility for ground nuts or peanuts, as one of its responsibilities. Through ICRISAT, through the International Plant Genetics Resource Board, North Carolina and cooperating governments in South America, we have obtained plant germplasm and now have included it not only in ICRISAT's collection, but in our collections at North Carolina State and at Oklahoma, thereby enhancing the genetic availability of peanut germplasm throughout the world as well as preserving it.

Just as a side point, we have talked about agriculture running out of, or deleting, traditional types or wild types of plants—whatever you wish to call them. I am told by our plant explorer, Walton Gregory, that he collected one of his specimens right in the center of an intersection of a highway in Brazil, and that had he not got that one collection, he would have missed it. It is not always agriculture that is doing the damage to traditional varieties or old-line varieties. It is also just plain industrial rural expansion in some of these countries.

So, the role that international centers play is that of collection of germplasm. The other work we do with international centers is

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training plant breeders and training these plant breeders to do breeding work in these Third World countries.

In summary, the questions raised by opponents of the legislation which you are considering have not dealt with specific issues of the amendments to the Plant Variety Protection Act, but with issues of genetic diversity, and breeders' rights. Mr. Chairman, in my presentation I have attempted to respond to some of these comments to show:

One, that the Plant Variety Protection Act protects the product and does not lock-up genetic information—nature—nor is it patenting life.

Two, that because of the close relationships between public and private plant breeders, the act leads to increased plant breeding efforts and thus frees public resources for research in other disciplines.

Three, that the impact of this total increase leads to an increase in genetic diversity, improved germplasm, and better varieties.

Four, that the relationship between U.S. public agencies, international centers, and research institutes of other countries lead to increased emphasis on germplasm collection and maintenance, and thus will benefit the U.S. consumers and consumers in the developing world.

I encourage the committee to take favorable action on this legislation so that we may continue to improve the varieties. Without the Plant Variety Protection Act, a major funding increase would be required for public agenices to replace the current private investments in research and research that has developed as a result of plant variety protection. If additional public funds are to be made available for genetics and plant breeding, they are needed in germplasm exploration, the development of new breeding technology and basic breeding studies so that we can move on to meet the challenges that exist for world food in the future.

I thank you for the opportunity to share these thoughts with you.

Mr. DE LA GARZA. Thank you very much, Mr. Caldwell.

Mr. WAMPLER. Mr. Chairman, I want to thank Dr. Caldwell for being here today, and thank him for his individual contributions not only as an individual plant breeder but as a teacher and researcher. He is president of the Crop Science Society of America, a very prestigious organization.

We in Virginia like to think of North Carolina State University as being among the greatest land-grant universities in America. We acknowledge that there are land-grant universities of lesser reknown than Virginia Tech, but I do seriously want to thank you and your colleagues for what you have done. I think you have made many contributions to agriculture. The agriculture economies of Virginia and North Carolina are very similar, and, and you know, our problems are common, but I think you have given us a great deal to think about, and as we do look at the assessment of priorities on where our limited Federal research dollars will be going in the future because it appears with tight budgets we are going to have to continue to try to get these needed appropriations so that we can maintain a viable agriculture in this country.

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You certainly have given us a lot to think about and given us a very good statement. It is one that I appreciate, and I know I speak for the rest of the committee when I thank you, particularly for your patience this afternoon and sharing with us your expertise. We are very grateful to you.

Mr. CALDWELL. Thank you very much.

Mr. DE LA GARZA. Thank you very much, Dr. Caldwell. We appreciate your being here.

[The prepared statement of Dr. Caldwell follows:]

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STATEMENT BY

Dr. Billy E. Caldwell

before the Subcommittee on

Departmental Investigations, Oversight, and Research
of the House Committee on Agriculture

April 22, 1980

Mr. Chairman, Members of Subcommittee and Staff. My name is Billy Caldwell of Raleigh, North Carolina. I am Head of the Crop Science Department, North Carolina State University, and President of the Crop Science Society of America. In my role as Department Head, I coordinate research, extension, and teaching programs relating to plant breeding and genetics, crop production, plant physiology and weed science. The Crop Science Society is a professional society of over 4,000 members in the disciplines of plant breeding and genetics, crop production, crop physiology, turf management and seed production. My training and individual research has been in the area of soybean breeding and genetics. I have also conducted research on nitrogen fixation with special emphasis on host genetics of the nitrogen fixing process. I have participated in a number of plant breeding conferences and contributed to the National Academy of Science publication on "Genetic Vulnerability" and the Special American Society of Agronomy publication on "The Effect of Food and Drug Administration Regulations on Plant Breeding and Processing". I edited the Monograph on Soybeans: Improvement, Production and Uses, and chaired the Second World Soybean Research Conference.

I am pleased to have the opportunity to appear before this committee in support of the Plant Variety Protection (PVP) Act and the proposed amendments to the Act (HR 999). The Act has benefited the grower and consumer through improved varieties that have better quality are more productive, and contain resistance to an ever increasing number of pests that attack our crops. The need for the future will be even greater as new races or strains of pests evolve. Resistant varieties will also be a major component for the new Integrated Pest Management (IPM) strategies.

The users of advanced technology such as new varieties, often fail to recognize that unlocking natures biological secrets becomes progressively more difficult. Through the PVP Act a plant breeder can protect his product, and reap the rewards of his efforts. This is true regardless of how or where he is employed. What is not protected is the new genetic combination that may have evolved. Since other breeders can use protected varieties as a breeding stock, new unique combinations of one breeder can be combined to produce even better combinations. Therefore, nothing is "locked up" nor is "life" patented. This unique feature of the PVP Act provides for an open use of the genetic material. Only the immediate product (the variety) is protected.

The concept of replacing "traditional" varieties with new, more vulnerable varieties needs a closer look. Most of our crop plants were introduced from other countries, and initially they did well. However, it was not long until pests from their original country and pests of the new world became a problem for these varieties. Therefore, it was necessary to select or develop new resistant selection (varieties) and production practices in order to grow fruit and seed. As these crops became established, so did the pests. New varieties were developed. However, since the pest variability is also under genetic control, new races or strains of pests also evolved -- some through sexual recombination and others as a part of the original diversity. There-

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fore, to believe that "traditional" varieties could have survived and produced crops is without scientific or logical basis. In addition, much of germplasm (traditional varieties) was poorly adapted or of unacceptable quality with low yields.

During the past 100 years plant breeding has moved from an art to a science. The original plant breeders were basically agronomist. Their goal was to seek ways of putting the newly introduced materials into production. For example, soybeans were first grown in Pennsylvania, and the records indicate that this plant was not adapted to the United States and would not contribute to United States agriculture. However, this was not accepted by Mr. W. J. Morse. He obtained other material from China and Korea and grew this material at the Arlington Farm -- the current site of the Pentagon. Based on his results, he encouraged others to try growing this crop to be used primarily as a hay or as a "green manure". These early types were viney with black seed. Later more erect, yellow seed types were observed. Selections from this material gave us our first seed-type varieties, and during World War II, the demand for vegetable oil was the impetus needed to estab sh soybeans as a major crop. The demand then required the development of varieties adapted to a range of environments. The art became a science and an understanding of genetics, maturity, lodging, disease resistance, nematode resistance, and oil quality was required. Breeding methodology for efficient selection had to be developed and discipline specialists n pathology physiology, soils and chemistry were enlisted to assist the breeders and agronomists. The challenge was met, and varieties were developed adapted to environments from Minnesota to Florida. Old varieties and many of the original introductions were retained and continue to serve as a valuable source of resistance to new races and strains of new and old soybean pests.

The PVP Act has provided an opportunity for the soybean breeding effort to expand. The additional of about 35 private plant breeders has provided flexibility to use additional public resources to pursue in-depth studies on genetics and physiology of the plant and to investigate the pests attacking soybeans. Currently, the number of soybean breeders in proportion to the total number of scientists is less than in 1967 when almost all the research was supported by USDA and Universities. Public agencies are and will continue to develop varieties and germplasm, but an increased effort is aimed at improving the genetic potential, new sources of pest resistance, improved quality and to allow specified emphasis on germplasm maintenance. For example, plant populations are being developed that include germplasm (old varieties and introductions) that will broaden the component that contributes to the reduced shelf life of soybean oil, and to improving the protein amino acids thus improving the nutritional value of the soybeans. Thus, the benefit of the PVP Act is to enhance the total research effort in soybean production as well as to provide for the protection of the newly developed varieties.

Because of the provisions of the Plant Variety Protection Act, and the total scientific effort needed to meet the challenge of the future; mutual interdependence exists between plant breeders of private industry and plant breeders and geneticists of public agencies. Through joint work conferences information on the latest techniques, and the priorities and goals of the future are discussed. This relationship is vital to both groups. New private varieties are evaluated by the State Official Variety Test programs to provide the grower a performance eva uation in comparison with other varieties. Germplasm and plant ntroduct ons from work ng collections are made available from USDA-SEA-AR collections and from public programs for use by both public and private breeders. Normally a public release of improved germplasm is made to provide recognition for the scientist and equal access to all. This material is not of value as a variety, but normally contains traits such as multiple pest resistance or improved quality which, if incorporated into high yielding varieties, would contribute to the income of the grower and lower costs of food to the consumer. Therefore, the

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cooperation between public and private plant breeders leads to increased genetic diversity and better varieties - not less diversity.

Another factor which enhances the cooperation between public and private plot breeding is personal relationships among the breeders. A strong public plant breeding program in the Universities is a neccesity in order to train plant breeders for employment by both public and private agencies. The bonds developed during a graduate program in the University leads to continued mutual trust and respect. Thus, information is often exchanged without a fear of loss of proprietary information. Public plant breeding programs need to remain strong to continue to develop varieties, germplasm, breeding methodology, and most of all to train plant breeders for the future.

A relationship that is vital to the issue of genetic diversity and germplasm exploitation in the United States and other countries is our relationship with international institutes, and research institutions of other countries. Most international centers have as a part of their assignment the collection and maintenance of germplasm important to that region or to the mission of the institute. In many cases their efforts are in concert with United States domestic and other international efforts. For example, in North Carolina we have been concerned with obtaining and utilizing introductions of peanut germplasms from the center of genetic diversity in South America. We have been supported in these efforts by the International Plant Board for Germplasm Resources, and by the International Center for Research for the Semi-Arid Tropics (ICRISAT) located in India. A part of ICRISAT's responsibility is groundnuts (peanuts). Our joint effort is to assemble and preserve as much material as possible of the species for use now and as a resource for the future. We are also developing complementary programs designed to utilize the germplasm. Similar examples could be given for other centers and institutes. Another role of the international centers is to assist those plant breeders of the developing countries in obtaining and utilizing improved germplasm. Thus, by meeting cooperative effort we are attempting to preserve existing genetic diversity and at the same time utilize the material to improve U. S. grown crops.

In summary, the questions raised by opponents of the legislation which you are considering have not dealt with the specific issues of the admendments to the Plant Variety Protection Act (HR 999) but with issues of genetic diversity, and breeders rights. Mr. Chairman, in my presentation I have attempted to respond to some of these comments and to show:

1) that the Plant Variety Protection Act protects the product and does not lock-up genetic information (nature) nor is it patenting life,

2) that because of the close relationships between public and private plant breeders, the Act leads to increased plant breeding efforts and thus frees public resources for research in other disciplines,

3) that the impact of this total increase leads to increase in genetic diversity, improved germplasm, and better varieties, and

4) that the relationship between United States public agencies, international centers, and research institutes leads to an increased emphasis on germplasm collection and maintenance, and thus will benefit United States consumers and consumers in the developing world.

I encourage the committee to take favorable action on this legislation so that we may continue to improve varieties. Without the Plant Variety Protection Act a major funding increase would be required for public agencies to replace the current private investments in research and research has developed as a result of variety protection. If additional public funds are available for genetics and plant breeding, they are needed in germplasm exploration, the development of new breeding technology, and basic genetic studies.

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Mr. DE LA GARZA. Mr. Wampler and I and two more of you have a problem, I think.

Mr. Doyle is here, and then we have Mr. Leidermann. We also have Mr. Smith. We have three more.

Why don't the three of you come to the witness stand. Mr. Doyle; Mr. Daniel Smith? Mr. Leidermann is not here?

We have a recorded vote on the floor of the House. We can either go over and vote and come back, or we can stay here approximately 10 more minutes. We will let you gentlemen decide what you would rather do. Should we go and get our voting done and come back?

Mr. DOYLE. It is up to the chairman. I would defer to the chairman.

Mr. DE LA GARZA. I think it is more expeditious to go now and come back. We will have a short recess now.

[Recess taken.]

Mr. DE LA GARZA. The subcommittee will resume its sitting.

Mr. Doyle and Mr. Smith, without objection, your statements will appear in the record. If you would care to summarize, we would appreciate it.

Mr. Doyle, please proceed as you see fit.

STATEMENT OF JACK DOYLE, WASHINGTON REPRESENTATIVE, ENVIRONMENTAL POLICY CENTER

Mr. DOYLE. Thank you, Mr. Chairman.

I appreciate the subcommittee allowing me to come back this afternoon after I missed the allotted time this morning. We had some problems, and so I was not here this morning.

For the record, my name is Jack Doyle. I am a Washington representative for the Environmental Policy Center, a nonprofit public interest group specializing in energy and natural resource policy at the Federal level. We appreciate the opportunity to appear before you today to express our views on the topic of plant patenting legislation, H.R. 999, and related agricultural and environmental issues.

The Environmental Policy Center offers this testimony here today at the invitation of the subcommittee, an invitation prompted no doubt by our letter of March 7, 1980, noting concern over the proposed amendments and the lack of general oversight on this legislation since 1970 and the whole issue of germplasm research and collection.

[The above referred to letter follows:]

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ENVIRONMENTAL POLICY CENTER
317 Pennsylvania Ave., S.E., Washington, D.C. 20003
202/547-6500

7 March 1980

Hon. Kika de la Garza
Chairman, Subcommittee on Department
Investigations, Oversight & Research
1434 Longworth House Office Bldg.
Washington, DC 20515

Dear Representative de la Garza:

The Environmental Policy Center is concerned about the present orientation of the nation's plant patenting system, our seed storage capability and protection, and the general status of our germplasm research capability. These issues bear directly on the structure and future of America's agricultural system as well as the integrity and viability of the nation's food-producing resource base and various ecological and genetic factors integral to maintaining that resource base.

We are concerned, for example, that 71% of the nation's planted acreage for corn, seeds, and silage is lodged in just six varieties of crops, and that such uniformity in agricultural planting and seed availability will leave us vulnerable to disease, blight, pestilence, and possibly corporate control. The National Academy of Science points to a 1970 corn blight which wiped out about one-fifth of that year's crop, and blames such catastrophe on the planting of fewer types of corn with basically the same genetic characteristics.

We are also concerned that some companies hold as much as two-thirds of the seeds for particular agricultural commodities, and that corporations whose primary interests are in chemicals and/or energy may increasingly play a disproportinate role in developing new patented varieties of seeds for agricultural use. Moreover, the possibility that such seeds will be developed to facilitate mechanized harvesting, or will require specific quantities and inputs of pesticides, herbicides and water raises serious energy, environmental, and ecological questions.

To our knowledge, there have never been any oversight hearings held by Congress on the Plant Variety Protection Act of 1970. Moreover, there have been several ominous developments since 1970 that warrant scrutiny, including seed company takeovers by large corporations, the rapidly increasing rate of seed prices for agricultural use, and some questions regarding the role of corporations in genetic research generally---all of which suggest to us that expanded oversight hearings on the Act and related matters are in order. For this reason and others, we respectfully urge that oversight hearings be held on the Plant Variety Protection Act of 1970 as well as the general status of the nation's germplasm research and preservation programs, particularly as these programs relate to the viability of small-business agriculture and maintaining genetic diversity.

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From our view, it is absolutely essential that these questions and developments be explored in some detail before further legislation in this area is finally drafted. Our concerns in this area quite obviously relate to a need for maintaining plant and seed diversity; to maintaining numerous small-business seed producers and research firms; to keeping seed costs down and seed stocks and varieties plentiful for farmers, ranchers and vegetable growers; and finally, to maintaining the important and essential interface between genetic characteristics and environmental quality---i.e., maintaining those genetic traits in a variety of agricultural plants which will enhance the natural operation of ecological systems with reagrd to soil fertility and quality, water and nutrient uptake, pest and disease resistance, and maximum commodity nutritional value and quality.

We respectfully urge therefore, that before proceeding with any mark-up on H.R. 999, or any other bill like it, that further hearings be held exploring those questions that we have raised in this letter, as well as those concerns of the scientific and agricultural communities.

Sincerely,

Jack Doyle
Washington Representative

Mr. DOYLE. Our concern relates both to substance and procedure. We have some concern, for example, about the way the U.S. Congress has considered this kind of legislation ever since 1930, when the first law pertaining to the patenting of asexually reproduced plants was adopted. We have questions about the way the U.S. Department of Agriculture has regarded its responsibilities under the National Environmental Policy Act with regard to the review of H.R. 999.

We have concerns over the potential impact of this law and these amendments on the agricultural resource base, maintaining the quality of that resource base, as well as the kind of agriculture that grows up around such crucial inputs as seeds. We have concerns over the role of this committee in reviewing the impact of this legislation since 1970, and finaly, we have concerns over the genetic ramifications of the patenting of plant lifeforms.

The Environmental Policy Center does not, at this time, support moving ahead with H.R. 999 until a series of questions have been answered in some detail and subject to further review by Congress, the scientific community, and the general public. It is our position that plant patenting and plant variety protection laws have never been fully scrutinized for their long-term biological, agricultural and economic impacts. Our reasons for taking this position have as much to do with the past as they do with the future.

I turn now to some congressional history on plant patenting and plant variety protection.

To reconstruct the congressional history of plant patenting legislation in the U.S. Congress since 1930 is to discover a record that raises more questions than it answers. Generally, the legislative process and executive branch review and participation in the plant patenting issue is confusing and inconsistent, and does not appear to convey a broad-based mandate. In some places, the record is fat with controversy: in others, thin on roll-call votes and review by

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committees that would appear to have some direct interest in such legislation.

Some historians and observers of the 1930 legislative process, which first extended patenting rights to breeders of asexually reproduced plants, have remarked that the 1930 Plant Patenting Act was thrown together hastily, with little careful deliberation on the substance of the issues involved.

At that time, an attempt was made to incorporate patenting privileges to breeders of sexually reproduced plants as well. That attempt failed. Farmers and scientists were among those who objected to that kind of patenting. The Secretary of Commerce at the time supported deleting sexually reproduced plants from the Plant Patent Act of 1930 because of this opposition.

In 1967, President Johnson's Commission on the Patent System noted, and I quote:

> While the Commission acknowledges the valuable contribution of plant and seed breeders, it does not consider the patent system the proper vehicle for the protection of such subject matter, regardless of whether the plants reproduce sexually or asexually.

The Commission later recommended repeal of the 1930 Act.

During the very limited 1970 House floor debate, when the House moved to consider the Senate-passed legislation in the waning days of the 91st Congress, hazy consideration again seems to have been the rule. In fact, one Missouri Congressman at the time, Mr. Hall, who was offering an amendment to the proposed bill, explained: "I'm afraid that with the speed with which we are acting, it has precluded prior discussion and distribution of the amendment."

A reading of that December 8 House debate reveals that less than 1 hour of debate transpired, with the Agriculture Committee chairman and floor manager of the bill, Mr. Poage, noting an overwhelming vote on the rule for the bill, Said: "It would be a mistake to take the rest of the afternoon on this and to interfere with the ceremonies which are anticipated a little later on this evening." And with that, Mr. Poage reserved the balance of his allotted 1 hour.

Further, some of the assertions and claims made by proponents of plant patenting legislation in 1970 need to be held up the light and examined in terms of the realities of the 1980's and beyond. For example, during the December House floor debate, Mr. Poage, chairman of the House Agriculture Committee at that time, claimed that the legislation would lead to the development of plant varieties that would be "resistant, more productive or more desirable."

He further stated in that floor debate, in which only eight Representatives participated, that a patent for such varieties will not increase the cost of anything the farmer now has. The farmer will have everything he has today without any increase in cost. Representative Kleppe from North Dakota also stated in support of the bill at that time that consumers and other purchasers of crops will benefit; in some instances by improved quality.

In 1970, for example witnesses appearing before this subcommittee noted that the farmer would be a prime beneficiary of the Plant Variety Protection Act. For example, Dr. Harold D. Loden,

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then director of Research for Anderson Claton & Co., of Belmond, Iowa, noted, and I quote:

> We state without fear of contradiction that the real recipient of the benefits inherent in this legislation will be the American farmer and indirectly the consumer of the products of American agriculture.

Others during that hearing joined Dr. Loden in extolling the expected economic benefits expected to flow to farmers—particularly the higher yields and lower per-unit costs—as a result of the proposed Plant Variety Protection Act.

Since 1970, have there really been such economic benefits to farmers as a result of this legislation? Generally, the data on the cost of seed for farmers since 1970 do not indicate that farmers are making huge cost savings in the area of seed. In fact, just the opposite appears to be the case.

There are questions as well regarding the role of the House and Senate Judiciary Committees in the consideration of plant patenting legislation, committees which presumably do have some jurisdiction over patenting and copyright legislation.

In January and February 1968 there were extensive hearings held before the U.S. Senate Judiciary Subcommittee on Patents, Trademarks and Copyrights. As far as we can determine, this was the last consideration of plant patenting legislation by any judiciary committee, and no final bill protecting sexually produced plants was ever reported from a judiciary committee.

I would like now to discuss consideration of new information, expanded public interest, and lack of comprehensive oversight.

Since enactment of the Plant Variety Protection Act of 1970, there have been a growing number of studies, controversies, and related issues which have grown large to produce questions and doubts about the intention and purposes of plant patenting legislation in the United States.

There is, at this time a whole body of scientific, agronomic, economic, genetic, environmental, and international information that has never been considered or reviewed by the Congress or the USDA in a comprehensive fashion as this information relates to the Plant Patent Act of 1930 and the Plant Variety Protection Act of 1970.

The National Academy of Sciences has issued two completed reports, one in 1972 and another in 1978, both of which bear directly on the issue of plant patenting and germplasm resources. The Academy is also preparing a study on the impact of seed prices. In its 1972 report, "Genetic Vulnerability of Major Crops," it was noted, for example: "The long-range effect of the Variety Protection Act on germplasm development, preservation, and exchange should be carefully studied."

There have never been, to our knowledge, comprehensive oversight hearings on the Plant Variety Protection Act in either the House or the Senate which has considered this body of new information. Moreover, the Supreme Court will review two cases that have a direct bearing on the issue of patenting lifeforms; an amicus brief in that case refers directly to the plant patenting laws.

There is a distinct lack of hard statistical data on the details of how the Office of Plant Variety Protection had performed in terms

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of the certificates issued and how these certificates have benefited the public interest.

There have never been any U.S. studies on the role of UPOV in its relation to plant patenting in the United States, or as to the beneficial or other impact of U.S. participation in UPOV.

Opinion in the scientific community remains divided on the question of patenting plants.

Since 1970, a whole new list of voices have been added to the controversy surrounding plant patenting legislation. Prior to 1978, many people were simply not aware that the biological basis of agricultural crops could be patented for commercial basis of agricultural crops could be patented for commercial purposes. Even today, many a backyard Burpee seed buyer has no idea that he or she is now buying from ITT. It simply has not dawned on many members of the general public that seeds can be patented. However, an increasing number of individual citizens, farmers, public interest groups, and others have begun to join concerned scientists and agronomists to voice their opinions about plant patenting laws.

The President's Commission on World Hunger has noted as recently as March 1980 that food crop vulnerability has been given a big boost by plant patenting laws.

The Midwest Catholic Bishops' Statement of Land Issues of 1980 includes a strong reference to the need to protect our genetic resources and review existing seed patent law:

> We must preserve for ourselves and for future generations the genetic variety of plants necessary to protect humanity from the hazards of inbreeding. We note with concern that inbreeding has become a major practice in our present agricultural system as greater yields and profits have been pursued. We also are disturbed by the acquisition of seed companies and patents by multinational corporations. The control of seeds, because it implies also the control of food production and indeed of life itself, should not be appropriated to itself by any company or nation. We therefore urge a careful review of present and pending seed patent legislation.

In addition to the new studies, opinion, and controversy which bear directly on the issue of plant patenting, there is also some old information worth looking at. For example, a February 1968 letter from then Secreatry of Agriculture, Orville Freeman, to Senator John McClellan, remains one of the most comprehensive documents of unanswered questions concerning plant patenting to date.

In short, there are innumerable questions that are now being asked for which there are no answers or precedents in the legislative history of the act, its legal history so far, or its administration to date.

Further, we do not feel that the two-page environmental impact statement offered by USDA last year on H.R. 999 was an adequate review of the environmental impact of the legislation pending before this subcommittee.

Plant patenting of any variety should be regarded as a major Federal action, since a patented variety of seed could have major ramifications for the environment and the economy for a period of 17 years, during which time major agricultural patterns and practices could be established or influenced.

It would appear to us that both Congress and the USDA are abrogating their responsibilities to the public by moving forward with an expanded version of the Plant Variety Act when neither

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has adequately addressed the question raised about the effectiveness of the act to begin with.

Has the act promoted variety in seeds available for commerical and small-scale agriculture? Has the act enhanced our genetic base of cultivated crops? Have the advances made under the patenting law yielding improved varieties that are beneficial in terms of both their genetic base and their environment effect? Are these advances quality, or nutritional advances?

It seems to us that the Congress and the Department are doing things in exactly the reverse fashion. Seed collection and seed storage in the United States are deplorable. The budget for seed collection is miniscule. Protecting, cataloging, collecting, and storing the germplasm base of all our cultivated and parent species should be an overriding mission of Congress and USDA.

Instead, we find that legislation has been enacted—legislation little known to the general public, a public that would, we believe, be gravely concerned to know what the NAS and others have said about the effect of this legislation—that will protect not variety of seeds, not a true variety of plants and seeds, but rather, a favored variety of seeds that have potential for world marketing and possibly higher yields, but perhaps lower resistance to blights and pestilence.

We believe it is safe to say that this Nation does not know what it is doing with its germplasm resources. There does not appear to be a comprehensive plan as to what the best course of action should be and there does appear to be some disagreement as to whether collection of germplasm is best, or preservation of native habitat is best, or use in an active agriculture is best. In the meantime, plant patenting, in a commercial sense, marches forward, helping to push both collection and native habitat farther and farther along the paths of extinction.

The National Academy of Sciences has identified the limited number of varieties used in the planting of major U.S. crops, and the proportion of crop acreage devoted to these varieties. NAS has found, for example, that three varieties of cotton account for 53 percent of all cotton acreage; three varieties of snap bean comprise 76 percent of all planted snap bean acreage; and two varieties of peas account for 96 percent of all U.S. acres planted in peas. The list goes on like this for wheat, corn, millet, peanuts, rice, et cetera.

In its 1978 study, Conservation of Germplasm Resources: An Imperative, NAS reiterated a finding it made in 1972: "The genetic underpinning of (crop) varieties currently grown in the United States is dangerously narrow, and these varieties have proved susceptible to changes in exposure to pathogens or in environmental conditions."

The amount of agricultural acreage given over to such a few varieties of crops as indicated by the Academy, prompted us to take a closer look at some of these crops on a State-by-State basis. Some charts that we have compiled on selected crops and for certain States are attached to this testimony. We would like to briefly summarize here some of our findings from this data. The charts have been submitted for the record.

Mr. DE LA GARZA. Without objection, the charts referred to will be entered in the record at this time.

[The charts submitted by Mr. Doyle follow:]

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Soybeans: Distribution of Major Varieties, Selected States
Percent of Acreage Harvested, 1978 Crop 1/

State	Leading Varieties by Percent of Acreage Harvested						Total Percent Top Three Varieties
	First		Second		Third		
	Name	Percent	Name	Percent	Name	Percent	
Ala.	Bragg	28.9	Ransom	19.0	Lee 2/	12.7	60.7
Ark.	Pickett 2/	27.6	Forrest	23.8	Lee 2/	15.4	66.8
Ga.	Bragg	73.9	Davis	8.2	Ransom	4.5	86.6
Ill.	Williams	31.1	Corsoy	7.8	Wayne	7.5	46.4
Ind.	Williams	27.5	Calland	11.5	Amsoy 2/	10.2	49.2
Iowa	Corsoy	27.0	Wells	8.2	Williams	7.1	42.3
Kans.	Williams	20.0	Clark 2/	17.0	Columbus	9.0	46.0
Ky.	Essex	31.3	Williams	26.9	York	11.9	70.1
La.	Davis	26.8	Bragg	26.8	Forrest	24.2	77.8
Minn.	Corsoy	36.8	Hodgson	25.8	Swift	9.3	71.9
Miss.	Bragg	24.0	Lee 2/	20.3	Davis	12.2	56.5
Mo.	Williams	44.2	Forrest	10.6	Mack	8.4	63.2
Nebr.	Amsoy 2/	21.9	Williams	14.8	Woodworth	8.6	45.3
N. C.	Ransom	53.5	Bragg	18.3	Forrest	7.0	78.8
Ohio	Calland	19.6	Williams	16.5	Wayne	10.7	46.8
S. C.	Bragg	36.6	Ransom	15.5	Bossier	10.6	62.7
Tenn.	Forrest	41.8	Essex	17.6	York	15.3	74.7

1/ Reported for sample fields used for obtaining objective data. 2/ Includes varieties with additional numerical designations such as Amsoy "71", Pickett "71", etc.

Source: Adapted from Georgia Agricultural Statistics, 1977-1978, Georgia Crop Reporting Service, November 1979, p. 41.

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Crop Variety Distribution For Selected States and Selected Crops

State	Crop	Variety	% Crop Acreage Planted to that Variety	Actual Acreage in that Variety
Arkansas (1978)	Soybeans	Pickett	27.6	1,297,000
		Lee	15.4	724,000
		Forrest	23.8	1,119,000
Colorado (1978)	Winter Wheat	Scout 66	21.8	632,200
		Baca	15.9	461,100
		Scout	19.0	551,000
		Centurk	17.0	493,000
Colorado (1978)	Barley	Moravian III	31.7	88,760
		Otis	18.1	50,680
		Steptoe	17.3	48,440
		Klages	10.4	29,120
Illinois (1978)	Soybeans	Williams	35.0	3,237,500
Illinois (1979)	Wheat	Abe	22.0	345,400
		Arthur	16.0	251,200
		Arthur 71	34.0	533,800
Kansas (1978)	Winter Wheat	Eagle	23.0	2,599,000
		Scout & Scout 66	19.6	2,214,800
		Sage	14.0	1,582,000
		Centurk	10.0	1,130,000
Kentucky (1978)	Soybeans	Essex		
		Williams	70.0	1,015,000
		Mitchell		
Maryland (1974)	Wheat	Arthur	32.4	-
		Redcoat	26.7	-
		Blueboy	18.0	-
		Arthur 71	14.0	-
Virginia (1979)	Peanut	Florigiant	92.0	94,800
Virginia (1979)	Barley	Barsoy	16.6	19,400
		Maury	10.3	12,100
		Rapidan	15.6	18,200
Virginia (1979)	Soybeans	Essex	49.3	246,500
		York	29.6	148,000
Virginia (1979)	Wheat	Arthur (incl. Arthur 71)	51.6	110,000
		Abe	16.2	34,800
Washington (1978)	Barley	Steptoe	74.6	298,450
Wyoming (1978)	Winter Wheat	Scout 66	15.2	49,704
		Cheyenne	24.7	80,769
		Lancer	16.8	54,936
		Centurk	16.5	53,955
Wyoming (1979)	Barley	Klages	41.4	60,440
		Steptoe	9.0	13,140

Source: Table compiled by the Environmental Policy Center, Washington, D.C. Based on data derived from State agricultural statistics and crop reporting service reports.

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Mr. DOYLE. The Georgia Crop Reporting Service has compiled in its latest Georgia Agricultural Facts a list of three leading varieties of soybeans by percent of harvested acreage for each of 17 States for the 1978 crop year.

By totalling the three top listed categories for each State, we found that the top three varieties comprised at least 42 percent of the total harvested soybean acreage for every State listed. Eleven of the 17 States had 50 percent of more of their soybean acreage in the top three varieties. Ten had more than 60 percent. Six had more than 70 percent and one, Georgia, had 86.6 percent. Georgia, Minnesota, Missouri, North Carolina, South Carolina, and Tennessee had more than one-third of their total harvested soybean acreage planted to one variety of soybeans. Georgia and North Carolina has more than 50 percent of their acreage in one soybean variety.

In Illinois, 35 percent of the planted soybean acreage, planted to the variety Williams, amounts to 3.2 million acres in that one variety. In Kentucky, where soybean acreage had more than tripled in the last decade, three varieties of seeds—Essex, Williams, and Mitchell—now comprise 70 percent of all planted soybean acreage, amounting to more than 1 million acres, predominantly in the western and north-central part of the State.

In a sampling of other State crop records we found similar patterns in other crops. In Virginia, for example, 92 percent of the planted peanut acreage in 1979 was seeded to one variety, Florigiant. However, what may be more problematic in the event of postilence or of blight is that the peanut region in Virginia is concentrated in the southeastern corner of the State in just nine counties over some 103,000 acres, where most of the Florigiant variety is planted.

In the State of Washington, 74 percent of the planted barley acreage—some 298,450 acres—in 1978 was in one variety of barley called Steptoe. Steptoe is also used in Wyoming and Colorado, where it is among the top three varieties which encompass 50 percent or more of the barley acreage in those States.

Three varieties of wheat—Abe, Arthur, and Arthur 71—comprise 70 percent of the wheat acreage in Illinois and Indiana, and about 65 percent in Missouri. four varieties of winter wheat—Eagle, Scout, Sage, and Centurk—comprise some 66 percent of all planted wheat acreage, or about 7,458,000 acres, in Kansas during 1978.

Kansas produces about 17 percent of the Nation's wheat on about 11 million acres. These same varieties dominate winter wheat plantings in Wyoming and Colorado.

The data we examined from the various State crop reporting services also suggested to us that new varieties can be rapidly put to use over a widespread area within the matter of a decade or even a few years. For example, in 1963, the three leading varieties of soybeans used in Kentucky were Clark, Hood, and Ogden. By 1973, not one of these varieties made up as much as 1 percent of the planted soybean acreage in Kentucky. In 1974, in Virginia, only 7.4 percent of the soybean acreage was planted to the variety Essex. By 1979, Essex was planted on some 246,000 acres, comprising nearly 50 percent of all Virginia soybean acreage.

The problem we are facing here is not only a problem of patenting certain lifeforms that may be impossible to distinguish for the

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purposes of legal enforcement and plant breeder protection, but we are also faced with an institutional infrastructure and business relationships which facilitate the use of new varieties of seed on a large scale and almost overnight. I am talking about the relationship between land-grant universities, the commercial seedsmen, and the farmer.

Farmers are always looking for new and improved seed, seed that will improve their yields, and therefore increase their return on investment. It has been shown that farmers will pay more for seed if it is known to produce higher yields. There is nothing wrong with this; it is just good business sense from the farmer's point of view.

However, according to one extension service research agronomist in Virginia, farmers in his area will take the advice of the extension service on new varieties "at the drop of a hat. It almost scares us." he said.

Farmers will listen assiduously to the advice of their neighbors and the extension service on the type of seed they should use. That is precisely the one problem with touting the superior virtues of some new and improved variety: every farmer will plant it hoping for maximum return on investment. With this kind of advice and these kinds of practices, are we planting the seeds of future disasters and disaster programs that will dwarf what the Government now pays out in any given "bad year?"

Furthermore, we may be drifting toward a time, when in the interest of plant protection and plant breeder rights and patent holders, the Government and the land grant complex will attempt to prohibit or advise against the use of exotic seeds, that is, any seed that is not patented.

In Mr. Mooney's book, Seeds of the Earth, an analysis of 562 patent certificates issued by the U.S. Plant Variety Protection Office through March 1979, reveals that some 46 percent of these certificates were issued to the same dominant 17 firms who have been most active in acquiring small seed companies.

These corprations include Sandoz, ITT, Union Carbide, Purex, Upjohn, Pioneer, Anderson-Clayton, Shell/Olin, Cargill, Celanese, KWS, and Ciba-Geigy. Of all patents issued as of that date, some 72 percent went for six crops, and predominantly to these same corporations. Seventy-nine percent of the U.S. patents issued on beans have gone to just four companies, and nearly 50 once independent seed companies have recently been acquired by corporations such as ITT, Upjohn, Purex, and others.

In its March 1980 report, the President's Commission on World Hunger has noted the interrelationship between plant patenting laws and seed industry concentration:

"Closely interrelated with patenting laws are distressing trends within the seed industry. Patenting laws, strongly supported by some large seed companies, have encouraged concentration within the industry. The number of seed company takeovers, particularly by large pesticide, fertilizer, and drug companies, has increased dramatically over the last few years. This could well lead to oligopoly pricing and the potential that narrow economic self-interests will be determining the fate of humankind's common heritage—agricultural diversity."

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If these developments are taking place within the seed industry, and the Plant Variety Protection Act is serving to further concentrate a biological fulcrum over agricultural production, then the antitrust ramifications of issuing plant patents or patent protection certificates are wide ranging and very real.

Does the U.S. Department of Agriculture have the authority or the ability to monitor the issuance of plant variety protection certificates for potential antitrust ramifications? We have already alluded to the institutional problem and the infrastructure that encourages the farmer to plant the seed of highest yield, and how this may play into the marketing of new seed on a frequent basis.

The limited legal monopoly that applies to patented plants is no insurance over complete monopolistic practices developing in certain kinds of seeds in certain regions.

Plant patenting and plant variety protection laws are forms of centralizing genetic information. While it may be true, as USDA points out in its latest Legislative Update of Plant Variety Protection Law, that "each new variety adds to the diversity of material available to growers," the issue is access to that diversity.

Farmers cannot afford computer consoles and information retrieval systems. While there is no debating the merits of collecting genetic information on a national and global basis for research purposes, and using computers to facilitate this process, there are some real questions about who will have access to, and who will most benefit from, the operation and development of such a systems.

If more small commercial seed breeders and small seed businesses are profiting and proliferation as a result of the 1970 Plant Variety Protection Act, then why do an increasingly shrinking number of large multinational companies hold patents on crops such as lettuce, beans, peas, and soybeans and wheat? The number of small research firms going into research and plant breeding is not reassuring in its own right. In time, many of these small firms will be subcontracted or taken over by the majors or prevented from marketing their seed through the greater promotional reach of the larger companies.

Some observers believe that agriculture is at a crucial juncture in terms of change. They are talking about a second revolution in modern agriculture. This revolution in modern agriculture may not be so much a revolution that benefits the farmer and the consumer so much as it benefits the corporation, the manufacturer, and the processor. This second revolution may not be a revolution in a cornucopia sense of quality foods and healthy farms so much as it might be a change in corporate strategy; a shift in marketing and production emphasis that moves from a hardware, factory-oriented approach in agriculture, to one that encompasses control of the biological elements of production, beginning, crucially, with seeds.

Dr. Erna Bennett, a genetic conservationist with the FAO, has explained how marketability and genetic selection can interact to have a negative effect on consumer, producer, and plant breeder. And I quote:

> In a society where economics are dominated by market considerations it is inevitable that these will eventually eclipse all others in determining what is grown and offered for sale. What matters most in such circumstances is salability—shape, color, size, yield (insofar as it affects price and therefore marketability), popularity

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with the consumer and such factors. Nutritive value, a factor affecting the consumer, and adaptability to soil and climatic conditions, a factor affecting the plant breeder and determining the chances of further genetic improvment in the crop concerned have no place in such a scheme of classification. Capacity to store well, to travel well, to respond well to mechanical harvesting and handling—characteristics often adversely affecting the flavor, tenderness and palatability of a vegetable—rate high. Disease resistance rates high also, though disproportionate attention is paid to diseases not affecting quality or yield but adversely affecting the marketable appearance of the crop.

Seeds are a determinant of agricultural systems. They can determine economies of scale for certain crops and kinds of farming. They can be bred for desirable characteristics which play to one kind of farming or another. They are literally the seeds of agriculture structure.

The onsite structure of a farm, its organization and operation, begin, in many ways, with the kind of seed that is planted in the ground. The composite structure of farms throughout the Nation, or the agricultural system as a whole, derives from these individual farms. Agriculture that begins with the information that rests in seeds can determine in large measure how much farm machinery of a given type is sold, how much energy is consumed in planting and harvesting, whether certain plants lend themselves to continuous cultivation or mechanical harvesting, et cetera.

However, there will never be one superseed that does it all. Never in a million years of evolution or in milenia of experimentation and breeding in the laboratory. There are limitations on what kind of improvements man can make on nature. History has certainly taught us that much. Nature's gift of wealth to us is in her diversity. Our task is to understand that diversity and use it constructively. We have seen the limitation of man's work in the hybrid seed.

There is more to diversity in agriculture than dairying in Vermont; growing corn in the Midwest; wheat on the Northern Plains; tobacco and peanuts in the Southeast; fruits and vegetables in California; or cattle in the West. And while USDA has often touted diversified agriculture in America from region to region, the real question is an agricultural system capable of absorbing, marketing, and sustaining agricultural diversity within farming regions and on individual farms.

Scientists, economists, and biologists all recognize the value of diversity in maintaining system viability. In the business and investment communities, diversification is an important strategy. Diversified protfolios are the investor's best insurance plan in unpredictable markets. Diversification in business is a way of protecting against total failure. Should the investment strategy for the Nation's food-producing resource base be any less protective or broadly grounded?

Seed development that enhances agricultural diversity and the diversity of product quality and product types might be oriented to specific geographic regions. The USDA should be using its considerable energies to expand our Nation's nutritional and genetic base by looking to various regions of the country for ways to diversify agricultural production within those regions through the use of new seed varieties or hardier varieties.

One goal of seed research should be to help diversify crop production within regions to insure against total vulnerability. The devel-

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opment of seeds for particular regions is not a desirable goal for a multinational corporation which is looking for a large and uniform market. Smaller seed companies, however, of the kind that are being acquired by the multinationals, would be appropriate small business suppliers for diverse seed needs of these regions.

Diversity in agriculture is an important germplasm conservation strategy as well. Small farmers using traditional varieties, seed collection and storage programs, free exchange of scientific information, encouraging farmer cooperatives to become involved in plant research and breeding programs—all these approaches can be supportive and beneficial. Collectively, they can insure against the total failure of the system. Similarly, maintaining native habitats and know progenitors is also an important conservation strategy. Set-aside programs might allow farmers to use set-aside lands for their own plant breeding and experimentation. There are many other possibilities as well that could be fashioned by USDA.

On the other hand, a course set in USDA that enables any narrowing of plant material or its control for the protection of proprietary interests, is indeed a course that is counterproductive to diversity in agriculture. It may be one which subtly leads the agriculture of this Nation into increasingly narrowing, more subtler forms of biological control over farming, further squeezing the embattled family farmer in the already tightened production and marketing margins that he constantly faces.

If the Secretary of Agriculture is serious about a structure of agriculture that promotes many different kinds of agriculture in the interest of insuring against the failure of the total system, then the Department should begin with a careful review of its own plant patenting role, and what plant patenting means for consumers, farmers, and environmental quality.

There are subtle obligations that come with eating the fruits which come from our biological storehouse. They include not tampering with the composition of that storehouse so as to restrict the range of its operation and evolution.

This is a reciprocal relationship, one of studied and careful symbiosis, a symbiosis that we do not yet fully understand from the side of the plant. Very simply, we owe more than we take, and that debt may be soon catching up to us.

Plant patenting may be infringing on a public right of choice, a basic right of sustenance, of what kinds and types of food we eat, of the nutritional value of the foods we eat, of how they are produced, and of what social cost is entailed in producing them.

Seed patenting will help to further vertical integration of agriculture—literally from the ground up—field-to-table control over what Americans and others eat. Farmers will increasingly become tenants, even on their own land, as input prices are increasingly controlled by a few suppliers and little meaningful antitrust action is taken.

The seed issue—and patenting in particular—encompasses the worst features of both monopolistic controls and biological tampering, and may be laying the groundwork now that will entail countless hours and cost millions of dollars to unravel, in endless legal battles, antitrust and lifeform controversies. Congress should take a very cautious posture with regard to this matter. It is on a

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crucial threshold that has wide-ranging ramifications for farmers, consumers, and national security. This subcommittee, in particular, and that of Judiciary and possibly Science and Technology, need to carefully review legislation of the kind before us today for the long-run ramifications and implications.

On the other hand, if Congress and the administration insist on continuing the plant patenting track that they are on, new criteria should be established for plants that are to be given patents, that is, criteria that reflect nutritional, quality and environmental goals, and which also serve to broaden the biological base, reduce environmental impacts and energy requirements—fertilizers, herbicides, pesticides, et cetera—and enhance environmental values—hold soil, fix nitrogen, attract beneficial insects, et cetera. Since the public has control over issuing such patents, the performance of those patented varieties should be of maximum public benefit. As it stands today, that does not seem to be the case.

Thank you for allowing me the opportunity to testify today and bearing with me.

Mr. DE LA GARZA. Thank you very much, Mr. Doyle.

Mr. Smith will be our next witness.

Mr. Smith, proceed as you see fit.

STATEMENT OF DANIEL C. SMITH, PEOPLES BUSINESS COMMISSION, WASHINGTON, D.C.

Mr. SMITH. Thank you, Mr. Chairman.

I am here today representing the views of the Peoples Business Commission, a Washington-based educational nonprofit organization. We have been involved in the area of genetic engineering on somewhat of a different level for the last 4 years.

We have done a tremendous amount of writing, researching on the broader perspective of genetic engineering.

Thank you for allowing us to testify today.

Mr. DE LA GARZA. If it will help any, your full statement will appear in the record after it is delivered.

Mr. SMITH. Briefly, the Peoples Business Commission has filed a friend of the court brief in the case of *Diamond* v. *Jacobar* which is currently being heard by the Supreme Court. Oral arguments were last month, and we expect a ruling from the Supreme Court at any time.

This is one of the most monumental Supreme Court cases of recent years. It is a case which is based upon presentation and claims of General Electric that they should be allowed to patent new lifeform created in a laboratory.

The American Patent law Association, whom you heard from today, not only favors the patenting of plants but also of microorganisms of all plants and of all the products of animal husbandry including—I presume that means, cow, pigs, and other animals. They have called the case of the Supreme Court the patent controversy of the century.

I fully endorse that and believe that it is much more than that. It is a case which literally and legally will establish the legal and philosophical basis for full-scale corporate entry into the age of genetics.

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The age of genetics is the newly developed implications of and development coming out of recent advances in molecular biology which are the most profound that has come from modern science.

The reason that corporations are so interested in this patent case is that unlike solar energy which kicked around for a number of years and then was put on the back burner, some believe because one could never patent the Sun, we now have a novel idea where corporations are, as we have new advances in genetic engineering, proposing that they be allowed to patent and own the germplasm of the planet in any form that they can convince the court is innovative or novel and unique. This is the ownership of the germplasm of the planet in this dimension and goes far beyond anything that has ever been proposed or considered in plant patenting. Plant patenting which we are considering here has been narrowly defined and outlined through statutes over the years, and it has still caused a tremendous amount of controversy, as we have seen.

This case which will certainly be of interest to the Congress as it will be to the Amercian public when it is handed down, shows us that the models that we have developed through plant patenting should not necessarily be used for broadening ownership over genetic resources.

For the first time in a 3 billion year evolutionary period, we now have the ability through molecular biology to cross the species barrier to splice at will.

Molecular biologists are making unbelievable statements recently about the ability to do anything we dream about with genetic molecules.

With some of the things that have been done with plants, and plant genetic resources, that gives us to pause to wonder how those will be implemented and used in the economic system or the patent system as we have them.

Genetic engineering impacts on agriculture from the new molecular biology if not then felt yet. Plant breeding though, is very much a genetic engineering technology and largely comprised of mathematical or physical concepts of breeding and interbreeding.

Molecular biology is the fundamentally new approach to the interaction of species in developing a crop.

We have something here which is showing that the dimensions and the possibilities are quite different from anything we have conceived of before. It requires a new way of using that information and of considering it. The arguments of General Electric and the American Patent Lawyers Association, the corporations and the patent lawyers, who very much have a vested interest in this new technology from the profit end, are trying to use outdated and quite archaic and ancient concepts of economic incentives for innovation and plant patenting developments to try to apply to the new technology.

They are arguing that the law can handle anything. However, I have maintained that the developments which are presented to us now are above and beyond anything we have seen before and require not just a response by legislators of two court cases that are brought through the system. They require some new innovative thinking to go along with that new innovative, if you will—it remains to be seen—technology that is being developed.

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Frankly, I have been somewhat distressed at the level of some of the debate that has gone on here today—the defensiveness, the closed or protective statements by so many of the plant advocates who believe that the system and the status quo will be sufficient.

I don't doubt that it is sufficient to maintain the system of agriculture that we have today, that has evolved as it has today. It will maintain that it will come up with incremental approved improvements or changes, but it will not handle revolutionary new interactions and ideas and developments.

I thought we would come here and get some new ideas about approaches to the problem. So in that sense it is very disappointing. The reason it is so flawed—the logic that is presented in such cases as General Electric—is that as we enter the genetic age and with these revolutionary technologies we are now backing up the stage and we are saying that life and the quality of life is important to us only for its economic good and only for the way we can ineract the chemicals of life, and we reduce everything in the living sphere to chemicals. It is the most reductionist and cold and calculated view of life. It is something that we have to guard against accepting—the vision of patenting genetic engineering as applied to life.

One of the problems that is fundamental with the new technology as it is developed has been discussed in the arguments that have been presented today. We are so transfixed with the technology, the new varieties, and the new seeds and things that come on, that we are not looking at some of the fundamental problems. For everything that there is a genetic conclusion, there is also more conventional solutions.

General Electric's oilspill-eating bacteria, which even the inventor or developer admits could become a very toxic substance and is uncertain what will happen when it is released in the environment is an example. There are other ways of solving the problems of oil in the world. In fact, I thought we were having an oil shortage. It seems to me to be very contrary to encourage a system that would bring us a new unseen never-known-way-before of destroying oil rather than conserving it as we need to in this day and age.

The examples of use of the technology for technological fixes and which will obscure the problems that exist abound. The case in the Supreme Court and its implications will be involved in a discussion tomorrow night at the Congressional Clearing House for members, if you are further interested in that.

The other concern of mine is the concern of genetic resources on the most broad scale as they exist on the planet. I have not really felt that it has been addressed here today. There certainly is a crisis in germplasm resources and the disappearance of species at phenomenal rates globally right now. We are doing on this planet at this time what the ice age could not and did not do—that is, destroying the complex web of gene pools and ecosystems of the tropics.

That is not a phenomena that is unintelligible or which we cannot deal with on this planet or in forums like this. It is not something that is out of our reach because, in fact, the Commerce Department is financing and sending machinery missions to Cameroon in the equatorial jungles and tropic forests in Africa to see if

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a massive $375 million woodpulp plant, which is to become the world's first woodpulp plant can depend entirely on virgin tropical hardwood forests for its wood source. The Commerce Department is going there to see if we can sell American technology to annihilate the rain forests of Africa. This is a 247,000-acre clearcutting which involves over 300 varieties of species in that area, all of which will be destroyed and used for pulp to go into making of paper for consumption in the developed world.

Not only is it in Africa, 82 percent of our hardwoods come from tropical forests in this country.

There are other forces which we are creating which are destroying germplasm resources which we have the power to do something about and which very much should be considered when we are hearing over and over again that seed banks in Fort Collins or new seed banks in Atlanta will solve the problem of the genetic viability and diversity.

That is not where the solution of the problem begins. That certainly is a role, but it is not where we begin to attack the problem. Yet we attack where we are directly destroying it.

One more example on that is this. The United States was quite self-sufficient in beef consumption into the midfifties. Since then we have relied more and more on imported livestock. There were 63 million pounds of beef imported in 1978. Twenty percent of that came from Latin America. There tropical forests have been clearcut on a massive scale to establish cattle ranches. The State Department reports that 38 percent of Latin America's massive forest losses resulted from the stripping of land for cattle ranching.

For every 1½ million pounds of beef which are imported into this country from the tropics, up to 75,000 acres of rain forests are cleared. It is a phenomenal tradeoff that we have allowed to occur here. It is almost unbelievable—20 pounds of beef for 1 clearcut acre of tropical forests. Twenty pounds of beef—that is just 84 quarter-pounder burgers. If you add a little fat you may get 100. I don't know what they put in them these days.

I find that appalling. And to think that we are sitting here talking about germplasm and genetic resources and saying that a seed bank somewhere is the solution and is doing it is pitiful.

The resources in the tropics are just one example. We do not even have a science established to know what different systems, replacement systems, will survive in the tropics from situations like that.

You can find them in just any Bioscience magazine. This is Bioscience of January, The Study of The Physiological Ecology of Tropical Plants, Current Status and Needs. This was joint-authored by Mooney at Stanford.

It is phenomenal—the lack of understanding of the web of resources that exist in the tropical forests in ecosystem niches.

It appears to me that if we are really committed to the concept of genetic diversity and preserving that which scientists are saying now—Dr. Robert Shuttles of Harvard who is director of the Botanical Gardens there, points out the incredible possibilities and the importance of the Amazon in the past and in the future. I quote: "For the survival of the human race we have the obligation to protect this nonrenewable gift of nature."

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These are people who know the potential for species diversity and its application. Yet we continue with our old and tried ways of allowing the economic system of supply and demand to force its way into developing countries.

If we are committed to diversity in species, we are going to be committed to the idea that for every diverse ecosystem and community living pattern in the world, there will need to be a unique ecosystem agriculture there. This is diversity. The systems have to be built from the roots up and we have to be committed to that.

For all the advances that come from the biological revolution it is the plant breeding as it exists or the great promises of nitrogen fixation crops of the recombinant DNA promises that are emanating from more advanced laboratories—we have some other fundamental problems. The lost crop land in this country is phenomenal. The National Land Study of the Federal Government is predicting that the United States, A $33 billion the year 2000. This is 20 years from now, and because of a massive loss of soil for nonagricultural uses.

If we don't tailor our ethic with the land and our respect for natural systems and major and compatibility with the diversity of genetic resources, we will be doomed.

Someone was suggesting here a little while ago that our seed system and its innovation in the corporate hands is——

Mr. DE LA GARZA. Mr. Smith, I have a problem. I have about 5 minutes to make a very important vote. Can you wind up in 1 minute? I will come back if you can't.

Mr. SMITH. I can wind up in one.

Mr. DE LA GARZA. One minute.

Mr. SMITH. We heard a lot about the need for innovation in America today. It is a good catch word for the American patent lawyers. It is sort of like a concept that if we produce more, we can feed the world. Those are not concepts that really mean much. They are catch words and phrases.

Instead of an economic model of patenting to be applied to genetic and biological systems, I think we need to go much better. It is sort of like—I think we have already done that. We have got a seed system that is sort of like Detroit. We've got some different companies here with different varieties. We need not too radical of a difference between your varieties. You need to have a little bit of improvement and a little bit different one here so that you can find your market niche. At the end of the generation of that seed, you need another replacement seed so you will develop something else.

That is fine. But what is happening there is that like the automobile, you have created fossil fuel dependency and we are going to have the same problems. When Detroit decided to change, and they needed to change drastically, it has met massive losses of jobs. Lord help us when the companies of this world decide to bail out.

Mr. DE LA GARZA. Mr. Smith, let me go and vote and come back. I do not want you to feel that you were cut off. Is that agreeable?

Mr. SMITH. Yes.

Can I ask you a procedural question? What is the stage of the process of this bill in terms of markup? When will that happen?

Mr. DE LA GARZA. We are not sure yet. It depends on time.

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Why don't I recess and get the vote out of the way? I will then come back and have you gentlemen finish your statements.

[Recess taken.]

Mr. DE LA GARZA. The subcommittee will resume.

[Discussion off the record.]

Mr. SMITH. I would just point this out for the record that a new report coming out of the President's Commission on World Hunger that is called "Overcoming World Hunger: The Challenge Ahead," dated March 1980, expresses a concern, to paraphrase this, very much as has been brought up here by the opponents of the Plant Variety Protection Act. They recognize that genetic diversity is the key. They recognize and acknowledge the National Academy of Science's material, the comments of Erna Bennett and the FAO on impacts on vegetables, and they strongly question corporations' takeover of seed companies and they express a forboding on what that brings.

I wanted to make this a part of the record, but the issue is out there and needs to be addressed.

Maybe we are a little frustrated because we don't feel it is getting nearly the broad look that this whole matter should be getting. So, in a sense, we wonder about this whole issue of germplasm resources and the policies to deal with those.

We recognize the proponents of this legislation and their feelings that there are bigger forces at work here than just plant patenting. There are some fundamental questions. We wonder who is addressing those, and where?

Mr. DE LA GARZA. The only thing I can tell you, Mr. Smith, is you can see the list of the witnesses from the last hearing, and the list of witnesses for today—unless you want numbers. They may not have gotten indepth—your presentation was very interesting and quite indepth scientifically. I wish we had more time. But it may well be true that as to that aspect of it there was not that much testimony, but you brought that to us. I attach some degree of quality to someone who takes the time and effort to prepare to come to a hearing such as this.

I do not feel that further hearings or numbers would add to this, really, and for someone to come and repeat what you have told us 8, 9, or 10 times. I think that you have added to the quality of the presentations today, both of you.

Mr. SMITH. Thank you for the remarks.

These hearings, as such, were not any kind of scientific study of the problem. They are, certainly, at best catch as catch can. I acknowledge that staff has tried to put together some diverse input, but this is not a record which has any scientific validity.

Mr. DE LA GARZA. Regretfully, that is the case. The legislative field is not the place for scientific research. All we judge is the impact of prospective legislation upon our society. That is just the way. We do not have the scientific background or staff. Regretfully, this has to be done some other place.

Again, you brought that to us. You contributed to that aspect of it. But a legislative hearing is not a scientific seminar. It is not a scientific endeavor where indepth research is made. That is not the constitutional responsibility of a legislative committee.

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Mr. SMITH. Certainly. But we would hope that you would help fish some of this out from the bureaucracies or the experts that are supposed to deal with it.

We appreciate being able to participate, but we hope it goes much further.

[The prepared statement of Mr. Smith follows:]

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PEOPLES BUSINESS COMMISSION

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"PLANT PATENTING AND GENETIC RESOURCES"

Dan Smith
Research Director, Peoples Business Commission

Testimony before the U.S House Agriculture Subcommittee
on Department Investigations, Oversight and Research
April 22, 1980

I am here today representing the views of the Peoples Business Commission and the newly formed Center for the Study of Genetics and Ethics -- a project of the PBC.

For four years PBC has led opposition to all forms of genetic engineering from in vitro fertilization to recombinant DNA research. In 1977 we sponsored the book Who Should Play God? coauthored by PBC directors Ted Howard and Jeremy Rifkin. Since that time we have engaged in educational and organizing work to probe the full implications of genetic engineering. Directors of the organization have spoken on over 250 university campuses and to labor, church and community groups and presented testimony to Congress, the Ethics Advisory Board of H.E.W. and the Virginia Health Systems Agency. We have written numerous investigative reports and commentaries on these matters of genetic engineering. Thank you for the opportunity to testify today.

Although plant variety protection occupies us at the moment there is another very important patent issue now before he Supreme Court which is pertinent to this debate and which will certainly be of concern to Congress and the American people in the very near future. This is the case brought by General Electric in which they have asked to be granted a patent on a genetically engineered microorganism -- a Pseudomonas which is supposed to be able to ingest and decompose oil.

Oral arguments were heard by the Supreme Court last month and a decision will soon be announced. The Peoples Business Commission filed an amicus curiae brief in this case supporting the Solicitor General's position that life forms are not patentable under current law. PBC's amicus brief was the only one arguing against the patenting of life. Numerous corporations, scientist and patent lawyers filed briefs supporting G.E. The case will determine whether General Electric becomes the first American corporation to be granted a patent on a genetically engineered living organism. A decision in favor

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of patenting life will very likely lay the foundation for a multi-billion dollar genetics industry that will pervade every facet of society. On the other hand, a decision rejecting the patent claim will be read to mean that the important social, ethical, economic, political and ecological questions associated with genetic engineering will remain in the public policy making arena where they can be publically and thoroughly debated.

The American Patent Law Association, advocate for over a decade of full patent rights over all of the agricultural arts including all plants, microorganisms and animal husbandry, has called this case "the patent controversy of the century." But this is much more than a patent case. Coming in the wake of a whirlwind of development in the field of molecular biology, the Supreme Court decision in this case could establish the legal and philosophical foundation for the Genetic Age. At stake is the utilization of a whole range of revolutionary bio-technologies and the opening of the entire gene pool of the planet to manipulation and exploitation by private interests. This presents a moral and ecological threat as profound as the development of nuclear weapons and technology.

For the first time in a three billion year development we have the ability and methods to intervene permanently in the determination and direction of genetic evolution. Using techniques ranging from recombinant DNA and plasmid transfer to in vitro fertilization, cell fusion and gene transplants scientists can study, dissect, and rearrange the genetic code of life. These techniques alone are profound. To argue that they require also a new legal and philosophical base of private ownership of the living material on which they are used, or for the products they assist in creating causes us grave concern. No longer are we dealing with certain classes of living things, such as asexually reproduced plants, which we might once have rationalized as a special category for which we would extend limited and well defined private property rights. Our technologies now are directed at that which all living things have in common -- their DNA.

Genetic engineering impacts on agriculture will soon be felt. Plant breeding being essentially an understanding and use of mechanical and mathematical concepts for genetic manipulation and expression has not begun to really feel the impacts of molecular biology. But they can not be far off. A burgeoning genetics industry has already invested millions of dollars in their quest for commercially saleable drugs, chemicals, pro-

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teins and bio-energy producers. Ten days ago it was announced that scientists at UCLA successfully performed a mammalian gene transfer -- the stuff of genetic engineering -- and that human clinical trials can be expected in just three years. As recently as last year a scientist told me such human applications were years, if not decades off. If breakthroughs are occurring so rapidly and so much capitol is being invested in the technology, it seems appropriate to ask why any patent protection is needed. But what is of utmost concern here is the view of life that patenting requires us to take. For if we assert, as the lower court did in the GE case, that "life is largely chemicals," then we cease to value life any more than inanimate matter. We take the mechanistic view to its conclusion that life is a bunch of chemicals which can be probed, changed and transformed as by any means which can be devised. This needs emphasis for we really have here two ways of looking at the world. We have the mechanistic, scientific way of analyzing and quantifying down to its tiniest components which then presents solutions in the form of another layer of technology, and we have the wholistic view which demands that entire environments and relationships be considered and realigned, if necessary. This difference in analysis and problem solving appears throughout the plant patent controversy. It takes much the same form when considering genetic engieering in its entirety. For every problem I can think of for which there is a genetic engineering solution proposed, there is also a more conventional solution or approach. We need to chart cancer prevention, not expensive hightechnological "cures." We need smaller, more manueverable oil tankers along with less consumption of oil, not potentially toxic and self-replicating bugs to be unleashed in the sea on the next oil spill. And why not curtail the use of toxic chemicals in agriculture instead of considering proposals from scientists who would genetically engineer 2,4D eating microorganisms to spread on over-sprayed farmland?

But, at base, it is very important that we as a society recognize and fully respect the sanctity and dignity of life. Once we begin the process of patenting life where will it end?

And another point especially for this subcommittee: Despite the assertion in a 1968 resolution by the American Patent Law Association that the "agricultural arts" encompasses all plants, microorganisms and animal husbandry, and the fact that microorganisms are certainly an important part of agriculture, G.E. disassociates itself entirely from any relationship to the plant patent or variety protection statutes in this case. But by this very claim that genetic engineered organisms are

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industrial products and processes, couldn't it follow that plant breeding is a similar process? If so, and it's really not so far-fetched, then we would never have needed plant patent or variety protection statutes in the first place since Section 101 of the patent statutes would also apply to them? Might we just be seeing here a very shrewd and slick attempt to circumvent plant patent laws? The overlapping issues here are large and the subcommittee should fully consider the implications of the case before the Supreme Court.

* * * *

Now I will address plant variety protection more directly. At the heart of this matter is the question of genetic resource preservation and diversity, and a system of agriculture which is compatable to and reenforces that diversity. On the surface, it would seem that we are talking about the necessity for nearly as many different farming systems as there are ecosystems and settlement patterns if we are to take genetic conservation and compatibility seriously. Unless there is a flaw in the logic of that statement we are talking about major overhauls.

Obviously we can't devise systems for all of the regions and varying geographical realities. It must instead be done from within those regions to meet particular needs.

First some questions. Does plant patenting contribute to genetic and agricultural system diversity? Are the techniques of modern plant breeding and seed storage practices helping solve the problems of feeding people while conserving gene resources or are they masking deeper problems which no new technological development can fully address? Where do we place our limited resources in this most crucial problem?

About seed gathering and genetic reserves. Professionals and journalists have recently proposed that a common ground might be found in the midst of this patent and variety protection controversy by focusing on seed storage programs and collection centers. But the problem is so vast and of such a character that collection and storage is not the beginning of the process. This has a definite place, but we could spend hundreds of millions on collection and propogation from storage and in no way reproduce the native order and truths about varieties and diverse environments. H.A. Mooney, et al., in the January Bioscience makes it apparent how little we know about the tropical forests and how they work and how the indi-

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vidual plants relate to them. "We lack information on the temporal and spatial distribution of environmental resources in natural or modified (tropical) systems," writes Mooney. The National Academy of Sciences 1978 germplasm resource study correctly states the point, "for preserving endangered species...we are repeatedly forced to the conclusion that the only reliable method is in the natural habitat....Preservation in nature does not require that we understand it, only an awareness that it must not be destroyed." Whole systems must be preserved.

Dr. Robert Shultes of Harvard clearly put the case forward last summer for one important area, the Amazon forest. Shultes describes it as having been the most abundant source of valuable domesticated plants in history and declares that the Amazon region's value in the future as a germ plasm resource is virtually uncalculable. "For the survival of the human race, we have the obligation to protect this non-renewable gift of Nature," writes Shultes.

So what are the forces threatening the destruction of native habitats? There is no doubt that there exists a global crisis today with the destruction of genetic resources and species. We are doing what the ice ages didn't: destroying irreversibly the complex web of gene pools and ecosystems of the tropics. This isn't an occurance which is unintelligable or even beyond our control for the process continues hourly with our sanctioning and our financing. The Commerce Department sends machinery missions to Cameroon to see if a massive $375 million wood pulp plant -- the world's first to depend entirely on a virgin tropical hardwood forest for its wood source -- will buy heavy machinery from U.S. companies like John Deere. And these companies are sending their equipment with no guarantees of sales.

That's right, since this massive -- 247,000 acres of land with more than 300 varieties of trees are scheduled for clear cutting and pulp processing -- project called "Cellucam" which begins operating this month is just the first of several pulp plants to be built in tropical Africa, companies are competing for future equipment sales by giving demonstrations.

And while we seek new forests to turn into paper in Africa we are simultaneously depleting other tropical forests to meet hardwood demands here in the United States where 82% of our imported hardwoods come from tropical forests. Elsewhere the driving forces of destruction are our high demands for beef. Though twenty five years ago the U.S. was virtually self-suf-

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ficient in livestock production, we imported 63 million pounds in 1978, 20% of which came from Latin America. There tropical forests have been clear cut on a massive scale to establish cattle ranches. The State Department reports that 38% of Latin America's massive forest losses resulted from the stripping of land for cattle ranching. For every million and one half pounds of beef exported from the tropics up to 75,000 acres of rainforest are cleared. This is a practically unbelievable tradeoff of 20 pounds of beef per cleared acre. That's just 80 quarter-pound burgers per acre of tropical forest sacrificed.

Can we actually claim that we are attacking the problem where we can be most effective? It's pitiful. I read a review last week of a book on a tropical forest. This was a favorable book review written by an Ohio University professor. After praising the book as a "classic" he added the ominous caveat, that the book's "true value to society will be measured long after the tropical rainforests of the world have been destroyed by the demands of an ever increasing population."

Another problem for us to consider is the massive loss of agricultural lands to other uses -- parking lots, suburban development, erosion. This is now being documented by the National Agricultural Lands Study of the Federal government. An interim report from the study documents such rapid loss of productive agricultural land that the U.S. -- now with food exports of $33 billion per year -- is on its way to becoming a food importer in just twenty years.

Obviously, no increases in productivity can be imagined which could keep up with these losses. We must determine to stem this disasterous trend. We lost eight million acres in ten years and, according to Gus Speth of the CEQ (Council on Environmental Quality), "every time we loose a couple million acres of cropland, that's a million people that aren't going to be fed."

But keeping soil in agricultural use alone isn't the solution altogether. High-yielding cereal crops themselves have resulted in the loss of half our topsoil studies show. Dr. Wes Jackson of the Land Institute in Kansas claims that "our high yielding cereals, as products of technology, have already destroyed more options for future generations than the automobile." (In terms of resource depletion and the foreclosing of options, of course.)

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The average loss from cropland has been estimated by Iowa State University at about 12 tons of soil per acre per year (4 billion tons nationwide). Corn fields now typically lose twenty tons per acre per year. If these figures are at all accurate shouldn't we seriously consider a massive change in cropping for those remaining productive lands we'll have in 2000? Are new varieties any better at maintaining topsoil and if so are those characteristics patentable traits?

Today the Green Revolution has been well documented as a culturally and scientifically biased proposition which has not fulfilled its promises. And yet private industry continues to peddle its wares in this package throughout the world.

Pioneer, for example, is exporting its hybrid seed corn and technology and now has seven different breeding stations worldwide in addition to 21 in North America. This promotes a seed system born and bred in the U.S. and cloned for export abroad. The international hybrid corn seed market has grown so that it is now greater (even when excluding the USSR and China) than the U.S. and Canadian market. Exports of hybrid seed corn topped $179 million in 1979. And according to Pioneer, the best overseas growth possibilities for the industry lie in exporting their seed technology as opposed to the seeds themselves.

In conclusion, we have some very fundamental non-technological problems which if they are not addressed will eventually catch up to and undermine our agricultural efforts no matter how prolific genetic engineering, plant breeding and the private dissemination of those efforts by private parties might become. We must conserve and develop the roots of our agricultural system so that we can rebuild it from the ground up. This will mean major and fundamental structural and goal changes many of which I have tried to point out.

Since there is no evidence that plant patenting and variety protection serves the need of such a diverse system and does, in fact, further undermine its establishment, it is your responsibility to defeat the proposed amendments and to go even further and take the next step: the repeal of all plant patent statutes.

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Mr. DE LA GARZA. Mr. Smith, you have made a most interesting presentation. I wish I could come and listen to you tomorrow night.

Mr. SMITH. They are giving dinner there. It is members only.

Mr. DE LA GARZA. Look where I am at this time. Do you think I could get the time to get there?

Mr. SMITH. It would be about this hour tomorrow.

Mr. DE LA GARZA. And I still have about 2 hours. I have constituents waiting. I have one sitting in and out of this room all afternoon, and he is a voting constituent.

Mr. DOYLE. I am not clear. Is this a hearing on H.R. 999, or is this hearing an oversight hearing?

Mr. DE LA GARZA. This is a hearing on H.R. 999, and we have hit every aspect of it. It has turned into oversight. It has turned into research. It is a very simple hearing on H.R. 999. Very few have addressed H.R. 999. They have hit the act. They have hit patents. They have hit basic philosophy of patenting microorganisms. We have hit everything but the simple H.R. 999 that says let's add tomatoes, cucumbers, okra, bell pepper, carrots and one other. Nobody has addressed that part of it.

Mr. DOYLE. Is it your feeling that oversight is not necessary at this time?

Mr. DE LA GARZA. No, I feel that Mr. Wampler and I have already assured some of the concerned witnesses that we will continue, separate from H.R. 999, oversight over this area. Very truthfully, the oversight had not been done because no one had ever expressed any interest. We are creatures of necessity, not having sufficient time. We are having oversight periodically over different parts of the Department of Agriculture.

We will have on this issue, like what you bring us, Mr. Smith, that really goes to the basic thrust. I don't know that H.R. 999 would have any bearing, really, unless a court decision can, by extension, be brought into it, I would suppose, without presuming that the decision would be a very limited, very narrowly defined decision. I refer to the *General Electric* case.

It is like that in most of those cases.

Mr. SMITH. If it is, I think it will be announced from the court with the intention that they would like input from Congress. I think that that certainly is very plausible, that is, that the whole issue will bounce right back here very soon.

Mr. DE LA GARZA. That will be handled in another committee, regretfully, if it goes straight to the patent issue.

Mr. SMITH. I would like to offer for the record, or at least for your personal benefit, if you will, the brief we filed in that case which raises some of the fundamental issues: The Case Against Patenting Life.

Mr. DE LA GARZA. The brief of your organization?

Mr. SMITH. Right.

Mr. DE LA GARZA. Without objection, we will make that a part of the record.

[The above referred to material is held in the subcommittee file.]

Mr. DOYLE. I understand there have been testimonies submitted by some scientists who did not make it here today. Are those testimonies to be printed in the record?

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Mr. DE LA GARZA. Yes, anything that was forwarded to us for inclusion in the record will be submitted for the record.

Thank you very much.

Is there anyone else who would like to appear for or against H.R. 999 who is not on the list?

If not, we feel that we have exhausted at least for today the issue.

We thank all of you who have appeared and for your testimony.

We will stand adjourned subject to the call of the Chair.

[Whereupon at 6:20 p.m. the subcommittee was adjourned.]

[Additional material submitted to the subcommittee follows:]

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HR 999: PROPOSED AMENDMENTS TO THE US PLANT VARIETY PROTECTION ACT

EVIDENCE SUBMITTED BY MR P W MURPHY, CONTROLLER OF THE UNITED KINGDOM PLANT VARIETY RIGHTS OFFICE, TO THE SUBCOMMITTEE OF DEPARTMENT INVESTIGATIONS, OVERSIGHT AND RESEARCH OF THE HOUSE OF REPRESENTATIVES AGRICULTURE COMMITTEE

INTRODUCTION

1. I am Mr Patrick Murphy, Controller of the Plant Variety Rights Office (PVRO) in the United Kingdom. The PVRO was established in 1964 by Act of Parliament and has the responsibility for administering the plant breeders' rights system in the UK. The UK system is broadly similar in concept to the plant variety protection arrangements operated in the USA, but extends to both vegetatively and sexually reproduced species.

2. This evidence is submitted in response to a request from the subcommittee for information on the operation of the plant variety protection arrangements in the UK. This request also invited comments on the relationship between these arrangements and the system operated throughout the European Community for the control of seed marketing (ie "National List" or "Common Catalogue" system).

PLANT BREEDERS' RIGHTS - THE UK EXPERIENCE

3. The UK plant breeders' rights system has now been in operation for just over 15 years. A detailed description of the way our system works is contained in the appendix to this document, which is a copy of an article published last year in the European Intellectual Property Review.

4. There were three main reasons why the UK introduced plant breeders' rights. The first was one of equity, ie that the plant breeder (like any other entrepreneur and inventor) deserved a reward for his work commensurate with its value to the community. The second reason was that by giving the industry the necessary confidence to undertake the long-term investment required, plant breeders' rights would encourage the development of a strong domestic plant breeding industry for the benefit of British agriculture. The third reason was to attract to the UK the best varieties produced by foreign plant breeders which were suitable for use under UK conditions.

5. If one regards the plant breeders' rights system solely in terms of the national interest, its principal objective must be the stimulation of investment in plant breeding. Two questions need to be answered in this connection. Firstly, is this a wholly desirable objective, ie what contribution can plant breeding make to agricultural productivity? Secondly, if it is a desirable objective, has the plant breeders' rights system been successful in directing private sector resources into this area of activity?

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6. I can of course attempt to answer these questions only in terms of the UK's own experience, and in doing so I must take into account the agricultural, economic and legal framework within which the plant breeders' rights system operates. One important element in this framework is the operation of effective arrangements for the dissemination of independent advice on varietal value. It is not, after all, a requirement of the UK plant breeders' rights system that to be eligible for protection a new variety should have any particular merit. Merit (eg in terms of yield, disease resistance, quality etc) is something which can be left to the market to determine, but for the marketplace to operate effectively there has to be available some system for the objective evaluation of varieties. For the main agricultural and vegetable crops, such a system currently exists in the UK, and it is highly effective. As an example, over 95% of all sales of cereal seed in the UK are of varieties of proven merit included on the "recommended lists" issued by the advisory agencies, notably the National Institute of Agricultural Botany.

7. Perhaps I can now deal with the first of the two questions posed above. There is little doubt that over the last 20 - 30 years the use of modern improved plant varieties, with higher yields, improved resistance to pests and diseases, better adapted to modern methods of cultivation and producing higher quality products, has made a very substantial contribution to the improved efficiency of the UK agricultural industry. For the UK, this contribution can perhaps best be demonstrated by taking the cereals sector as an example, since here sufficient data are readily available in an easily comprehensible form.

8. A recent study* has shown that between 1947 and 1975 the average UK wheat yield per hectare increased by 84%, of which no less than 50% was attributable to new varieties. The same study showed that over the same period the barley yield increase amounted to 63%, of which 31% was attributable to new varieties. Various estimates have been put on the total annual value of these varietal improvements in wheat and barley; these range from £30 million to over £100 million, depending on what figure one takes for the current rate of varietal improvement. At the present time, the higher figure is likely to be nearer the mark.

9. Perhaps the most startling impact of plant variety improvement in cereals is on the level of UK self-sufficiency. In the early 1960s, we managed to produce little more than 60% of our requirements of the type of grain which it was possible to produce on a large scale in the UK; today, we are more than

* Mrs Valerie Silvey (1978) Journal of the UK National Institute of Agricultural Botany, Vol 14 pp 367 - 384

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self-sufficient and the trend is continuing upwards. Some of this increase has resulted from increased acreage, improved methods of husbandry and developments in processing techniques, but a substantial proportion is the direct result of investment in scientific plant breeding in both the public and private sectors.

10. Plant breeding contributes to agricultural productivity not only in the form of yield increases. UK crop losses from pests and diseases run into the equivalent of hundreds of millions of dollars a year, and it has been shown that disease-resistant varieties have a major role not only in reducing these losses but also in reducing the heavy cost of chemical control (this point will be enlarged on below). Furthermore, plant breeders are facing demands for new varieties needed to satisfy changing consumer requirements, eg vegetables suitable for the deep freeze and potatoes less susceptible to mechanical damage, discolouration and waste. Plant breeders are also showing themselves capable of meeting changed processor and grower requirements. Examples include the breeding of malting barleys producing higher malt extracts, thereby reducing the costs of beer production, and grass varieties showing greater persistence, greater competitive ability, or more suitable seasonal growth patterns in terms of the demands of the livestock producer.

11. Finally - and this is a significant point which can be so easily overlooked - plant breeding represents the only means of increasing the potential yield of crops and grass. All other scientific or practical measures (eg improved forms or use of machinery, agrochemicals, drainage, and more efficient management and husbandry) can do no more than exploit or safeguard the genetic potential created by the plant breeder. It is therefore quite clearly desirable to ensure that adequate investment in plant breeding is maintained; without this, the unique contribution which the plant breeder can make to agricultural productivity is in jeopardy.

12. We therefore know what plant breeding can achieve. But what has been the specific contribution so far from the commercial plant breeder, who is likely to be the principal beneficiary under the plant breeders' rights system?

13. Before 1964, UK commercial plant breeding was in decline. This was the firm conclusion of the Committee on Transactions in Seeds, a government committee which examined the industry in 1960*. It concluded that "only a small number of commercial houses interest themselves in plant breeding in the agricultural and horticultural crops" and that "the commercial breeder who

* Report of the Committee on Transactions in Seeds, July 1960 paras 32 - 33 (Cmnd 1092)

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devotes himself solely to plant improvement, and seeks to make a living from it, is almost extinct". This situation must be compared to the one which obtains in the UK today. The number of companies actively involved in plant breeding in the UK has increased substantially since our plant breeders' rights legislation was introduced. As an example, the private sector membership of the British Association of Plant Breeders (BAPB) has increased from 10 in 1967 to 23 currently. These figures represent full private membership of the Association, which is open only to companies with a bona fide breeding "presence" in the UK. They include both small and large companies, but do not cover plant breeders active only in the ornamental sector. A further, and more telling, example is the growth in direct private sector investment in plant breeding over the last five years. This has increased by no less than 500% during this time/.

14. The increased activity in the private sector is being reflected in the flow of new varieties. In most species, it takes between ten and fifteen years before a breeding programme reaches the stage of producing finished varieties. It is therefore only in the last few years that the full impact of the plant breeders' rights system has been felt. This can best be illustrated by the numbers of new applications submitted for variety protection. These have increased from 107 in 1966 to 157 in 1970 and to 408 in 1978; the 1979 figure has however shown a decline to 276 but this is expected to be only a temporary phenomenon.

15. The increased private sector investment is also beginning to have a major impact on agricultural productivity. I have already referred to the study illustrating the improvements in cereal yields attributable to new varieties. This same study shows that in the ten years 1967 - 1977 the increase in average wheat yields due to variety totalled 30%; for barley, the figure was 10%, 7% of which has occurred in the last five years. These improvements do of course represent the fruits of both public and private sector research. The new wheat and barley varieties which have yet to be released on a fully commercial scale or which are still under official test are maintaining, if not accelerating, this rate of improvement; this is particularly so in the case of barley, which is the most extensive crop in the United Kingdom and in which the private sector plant breeding effort has been greatest. Virtually all the cereal varieties included on the advisory recommended lists issued in the UK are now subject to plant breeders' rights. These have therefore been bred (by private or public sector breeders) since 1964.

/ BAPB estimate

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SPECIFIC POINTS ARISING FROM EVIDENCE AT EARLIER HEARINGS

16. Following these more general remarks, perhaps I can now turn to some of the specific points made at the subcommittee's hearings last year and on which comments based on the UK experience of plant variety protection might be relevant. I would like to deal with four of these, viz

a) the issue of "illegal" varieties marketed within the European Community;

b) the possibility that plant variety protection increases the risk of "genetic wipe-out";

c) the possibility that plant variety protection might lead to the exploitation of seed users by large multinational plant breeding companies;

d) the contention that it is in some way unethical or immoral to grant rights in new plant varieties.

"ILLEGAL" EUROPEAN VARIETIES

17. Under European Community law, seed of the more important agricultural and vegetable crop varieties may only be marketed within the Community if the variety concerned has been found to be distinct, uniform and stable and has accordingly been entered on a National List of a Member State. In the case of varieties of agricultural crop species, a variety is subject to an additional examination to establish that it is of satisfactory value for cultivation or use. This legislation is designed to protect the European consumer through the elimination of synonyms and by ensuring that seed which is marketed is capable of reproducing itself true to variety. It has nothing whatsoever to do with plant breeders' rights. In the UK, for example, we introduced plant breeders' rights in 1964; it was only in 1973 that we applied the European Community system to agricultural and vegetable seeds, and we do not have any statutory marketing control over a large range of species for which plant breeders' rights schemes apply (eg fruit and ornamentals). Two of the nine Community Member States still do not have any plant breeders' rights legislation. There is therefore no connection whatsoever between the mandatory public law arrangements in Europe for the control of seed marketing (ie the National List system) and the voluntary private law system for plant breeders' rights. It is moreover quite wrong to suggest that the first is necessary for the enforcement of the second; the two systems stand on their own and in the UK are implemented under quite separate regulations. All they have in common is that the technical tests for establishing distinctness, uniformity and stability serve both for plant breeders' rights and National List purposes.

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18. I understand that at the hearings on this legislation last year much was made of the "disappearance" of old vegetable varieties in Europe as a result of the EEC Common Catalogue system. Three points need to be noted in this respect:

a) as I have already pointed out, the Common Catalogue system has nothing whatsoever to do with plant breeders' rights;

b) many of the "old" varieties were not varieties at all but merely synonyms;

c) a large number of varieties would disappear anyway as a result of commercial pressures. This would happen whether or not plant breeders' rights or the National List system were in existence.

19. Perhaps I can add a little more background about the EEC Common Catalogue system and the multiplication of names. When the UK introduced the system in 1973, few problems were encountered with the more important agricultural plant species since varieties had previously been classified and synonyms largely eradicated. This work had been started as long ago as 1919 and UK interest in it had been stimulated by three main factors:

a) the need to distinguish disease-resistant potato varieties;

b) to ensure that cereal seed sold to growers was true to variety name and could thus be associated with the results of variety trials; and, later,

c) to deal with the problem of nomenclature in cross-fertilised species where there is a tendency in successive seed multiplication for the varietal characteristics to alter; this is sometimes referred to as "varietal shift".

20. Little work of this sort had been done in the vegetable field and it was here that difficulties were experienced. These arose principally from the fact that prior to 1973 many seed firms marketed seed of vegetable varieties under their own "brand" names; this often meant that seed of the same variety was sold in various parts of the country under different names. Occasionally, seed of different varieties was sold under the same name. This was confusing for both the purchaser and the trade. The Common Catalogue system means in effect that varieties are now being properly classified and synonyms are being phased out, although the variety itself remains on the market under a single and correct varietal name.

21. It has been suggested by some who gave evidence last year that it is against UK law not only to market seed of an unlisted variety but also to grow it. This is untrue. We do have an area in Essex which is a protected area for the purposes of seed production. In this area, growers of commercial crops

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of beet, brassicas and onions can be required to "top off" their bolting plants before flowering to prevent cross-pollination with registered seed-producing crops. Failure to do so can result in a fine of up to £20 for a first offence. This has nothing to do with plant patents, Common Catalogue or the like. Outside this area of Essex there are no restrictions whatsoever on the growing of the normal range of crop varieties.

"GENETIC WIPE-OUT"

22. The contention here appears to be that because the plant breeders' rights system gives direct encouragement to the production of improved varieties, this leads to the elimination of the older, less successful varieties and to the consequent loss of genetic resources. Three points might be made here. Firstly, in the case of the UK, one could argue that the risks of "genetic wipe-out", thanks to the investment in plant breeding, are less now than in the recent past. In the early 1960s, for example, UK winter wheat and spring barley production was dominated by two varieties, CAPELLE DESPREZ and PROCTOR; each of these accounted for between 60% and 70% of the total acreage of their respective crops. This was before we introduced plant breeders' rights, and gives some indication of the lack of varietal diversification at this time. Now, with a much larger choice of varieties available, it is deliberate advisory policy to recommend the diversification of varieties with different inherited disease resistance, so that (eg in the case of winter wheat) not more than 30% of the crop area is occupied by one variety.

23. Secondly, talk of "genetic wipe-out" tends to be associated with disease susceptibility. Here UK experience might be relevant. One of the most important objectives of plant breeding in the UK, particularly in the major agricultural crops, is to produce disease resistant varieties. In the case of wheat for example, fungicidal treatment against yellow rust is, for many varieties, unnecessary, since the level of genetic resistance against the disease is high. The commercial succes of a new variety (in terms of royalty increase) reflects the quantity of seed purchased by growers. In many crops, this is dependent on its inclusion in an advisory "recommended list". A variety which has been found in trials to show a level of disease resistance below a minimum standard will not be included on these lists, and is therefore unlikely to achieve any commercial return for the breeder.

24. Thirdly, if "genetic wipe-out" represents a real threat, the answer must be to conserve genetic resources scientifically, eg in gene banks. Dependence on the random discovery of desirable material in the more remote areas of the third world is surely not a desirable position to be in. Nor is it reasonable to expect any country - developing or developed - to hold back its agricultural development in order to continue

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CONCLUSION

31. Perhaps I can conclude by quoting the following extract from paragraph 112 of this same official report:

> "Our firm conclusion from these facts and arguments is that steps should be taken to help the plant breeder overcome the disabilities under which he now works in this country. He should have the opportunity, which the grant of some form of protection against exploitation would give him, to share more fully in the wealth he helps to create. We believe this is justified as a matter of equity. At the same time, we think that a practicable scheme for encouraging plant breeding by private enterprise would benefit agriculture and horticulture, and serve the national interest."

32. I hope that I have been able to demonstrate in this evidence that experience of the UK plant breeders' rights system over the past 15 years has confirmed the wisdom of these remarks. Following the recommendations contained in the report, we now have an expanding and successful private sector plant breeding industry which, in conjunction with an independent advisory trials system, is making an increasingly important contribution to agricultural productivity. I hope too that I have been able to correct some of the misunderstandings which appear to have arisen within the USA concerning the operation of the UK plant breeders' rights system. If however the subcommittee has any further questions which it would like to put I would be happy to submit a supplementary paper.

(The article from the European Intellectual Property Review submitted by Mr. Murphy is held in the subcommittee file.)

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particularly after the owners had retired or died.
That big companies buy smaller companies is in a capitalist system not uncommon nor persé unethical. It is not a valid argument for condemning plant variety protection. At best it could be used as an argument to change from a capitalist to a socialist society.

I have noted that some public breeders have expressed opinions against plant variety protection. These breeders either work for international institutes such as CIMMYT, CIAT, etc or they are employed by national institutes, for instance universities. Institutes like CIMMYT and CIAT work for the developing countries on a strictly non commercial basis. As these institutes receive their funds from Foundations, such as the Rockefeller and the Ford Foundation or from national Aid Programmes, breeders working in these institutes need not bother about the "economics" of their work. Their only task is to make a many suitable varieties as possible available to the developing countries. For them and for their institutes there is no necessity to support plant variety protection legislation. On the contrary, they feel that this legislation may complicate their life as they 1° are afraid that private breeders will not make their material so easily available to them, 2° are afraid that others (private or public) wou d apply for protection of varieties developed by them (they have this in their own hands, as varieties must be novel i.e. not commercialised before the application for protect on has been made) 3° have to be a little bit more careful that when releasing new varieties they do not infringe upon prior rights of others.
Breeders working in the public sector on a national level may be against plant variety protection legislation because they are afraid that they will lose their job, once private companies become more active in this field.
Here again, we wish to refer to countries with a 30 year's experience with plant variety protection legislation. Not only has the number of jobs available to graduated plant breeders increased considerably: it is also true that plant breeders, geneticists etc have continued to be required by the public sector not only for educational purposes but above all for fundamental research.
If we take all this into consideration I believe that there is sufficient reason to treat statements on plant variety protection legislation by breeders of the public sector with some reservation.

A truth that I never saw mentioned is that in the countries with the longest plant variety protection history to wit Germany and the Netherlands:

1) plant breeding by private companies is better developed and on the whole probably more successful than in other countries.

2) yield increase in these countries over the past 30 years attributed to plant breeding has been calculated at 1% per annum by independent scientists. Both countries belong to the countries with the highest yields in the world.

Although I am not the best qualified person to point to this I would like to mention that the argument that the introduction of the PVP Act in the USA has not changed anything betrays an absolute lack of knowledge of the developments in this area.
A simple study of the applications for PVP in the USA teaches us

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that since the introduction of the PVP U.S. private plant breeding companies who were before mainly active in the field of corn, vegetables and flowers have started great activities in the field of the breeding of new varieties of all cereals, soybean, peanut, rice, grasses and clovers etc, fields in which they were much less active before as the results of their work could before the PVP Act was introduced not be protected.

Finally I would like to make some comments on the danger of genetical wipe- out.
Both private and public plant breeders have recognised this danger and have in their international technical organisation EUCARPIA contributed to the setting up of Gene banks.
The fact that particularly the high yielding varieties developed by the international institutes such as CIMMYT have (necessarily) contributed to the disappearance of land races in the developing countries shows that this argument has nothing to do with plant variety protection as these are non proprietory varieties.
Against the considerable yield depression due to the helminthosporium maydis attack in the USA stands a yield increase of up to 100% or more in comparison with the traditional open pollinated varieties used in the thirties and this over a period of forty years! I would call this progress at a very, very acceptable risk without which we would have a food problem in the world of unknown dimensions.

Due to the the time factor it is impossible for me to enter into all arguments which recently have been used against plant variety protection. Most are really very far-fetched or untrue. The reliability of quotations I have seen and the conclusions drawn from these quotations are doubtful as I can testify by personal experience. (Seed on the Earth, P.R. Mooney; page 50).

Yours sincerely,

Hans H. Leenders
Secretary General

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95814

(916) 445-6956

Department of Conservation
Department of Fish and Game
Department of Forestry
Department of Boating and Waterways
Department of Parks and Recreation
Department of Water Resources

EDMUND G. BROWN JR.
GOVERNOR OF
CALIFORNIA

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

Air Resources Board
California Coastal Commission
California Conservation Corps
Colorado River Board
Energy Resources Conservation and Development Commission
Regional Water Quality Control Boards
San Francisco Bay Conservation and Development Commission
Solid Waste Management Board
State Coastal Conservancy
State Lands Commission
State Reclamation Board
State Water Resources Control Board

Honorable E. de la Garza
Representative, U. S. Congress
1434 Longworth House Office Building
Washington, DC 20515

Dear Mr. de la Garza:

Because a vigorous and diverse California agriculture is of such great importance to our State and the entire Nation, we would like to convey to you some of our concerns about HR 999, a bill that would amend the Plant Variety Protection Act of 1970.

We feel that HR 999, as it is now written, could have a profound effect on California producers in regard to the flexibility they now enjoy in selecting seeds, and on all of the Nation's consumers in regard to the wide variety of agricultural products available to them.

More important, however, we are concerned about what we see as an inexorable trend toward narrowing the genetic base of our agricultural crops. The consequences of this trend were previewed in 1971 when Midwest corn growers suffered massive losses to a virulent fungus disease to which the widely planted corn varieties had no defense, and for which there was no adequate control measure available.

While HR 999's potential for reducing agricultural gene resources is our greatest concern, other aspects of the bill also invite careful consideration. The key concern of the bill's proponents is protection of the proprietary interests of plant breeders and seed companies that invest large amounts of money in the development of new seed varieties for today's markets. The key concerns of the critics is that one consequence of the legislation may be to reduce genetic diversity, and hence increase vulnerability of our economic crops to insects and disease.

Because of the apparent close relationship between plant variety protection efforts and maintenance of genetic diversity, it seems appropriate that the latter issue be considered together with the former, and that plant variety protection efforts in fact be coupled with a strong, and adequately supported program for preservation of gene pool diversity.

Many scientific authorities, including the National Academy of Sciences in its 1972 report, Genetic Vulnerability of Major

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Cro s, and Nobel laureate Norman Borlaug, have criticized the tre: 3 to shrinking gene pool diversity. The tendency to plant fewer varieties of a given crop has been, in some ways, a logical response to the economic pressures facing farmers and seed companies to strive for the highest yielding or most profitable seed varieties; however, the consequences of such specialization for vulnerability of crops to pest depredations is what concerns these specialists.

We are all familiar with complaints that the taste and nutritional quality of disappearing older varieties, especially of vegetables, was superior to that of newer strains which have been selected in large measure for traits, such as ease of harvest and marketability, as well as yield and hardiness. But the more fundamental question concerns the viability of an increasingly specialized agriculture. The southern corn leaf blight of 1971 reminded us of the dangers of too narrow a range of varieties in a major crop. With half of the processing tomato acreage planted to a single strain, California might be similarly prone to massive crop losses. The seed industry's own programs are insufficient insurance against such losses. The National Academy of Science also has expressed concern over damage to the gene pools of many crops over recent years, and the decline, rather than increase, in diversity of plantings of patented varieties since the 1970 law was enacted. While we recognize that the intent of HR 999 is "to increase research and species," there is dispute over whether it would in fact do so.

Attempts are underway to establish and maintain germ plasm banks, such as the federally sponsored facility at Fort Collins, Colorado. However, these efforts are insufficiently funded and may be themselves inadequate without maintenance of gene pool diversity in natural habitats.

Another trend that gives us great concern is concentration in the seed industry. It may be legislatively unwieldy to address this issue in the bill itself, but the problem is clearly connected with the subject of the bill and must be discussed at this time. The priorities of managers of multinational firms may not be the same as those of cautious Department of Agriculture officials or of most farmers. There is the possibility that management imperatives will force large seed companies, many of which are part of diversified conglomerates, to prune all but the most profitable product lines reducing the diversity available to the working farmer. More specifically, the acquisition of many seed companies by agri-chemical companies raises additional questions of what characteristics will be selected for inbreeding programs--disease resistance or fungicide dependence, for example. At a time when the U. S. Department of Agriculture and others are seriously examining ways to reduce agriculture's dependence on energy intensive chemicals, the impact of these acquisitions certainly ought to be discussed. Strictly speaking, it may be extraneous to this bill, but the issue is closely linked. The Agriculture Committee should hold hearings on the impact of concentration in the seed industry on genetic diversity--in advance of proceeding with HR 999.

Finally, we are concerned about United States' participation in the International Union for the Protection of New Varieties of Plants (UPOV). European members of UPOV are now engaged in developing a system of designating "legal" and "illegal" vegetables, based on whether or not vegetable varieties have been patented and are included in a "Common Catalogue" which designates which vegetable seeds can be legally sold.

We understand that there is a clear distinction between the patenting and listing programs, and that participation in UPOV

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does not require or indicate adopting lists of "illegal" varieties. Our fear remains that at some future time the United States may choose to rely on the same administrative convenience the Europeans moved to--that is, using the lists as a partial solution to the difficult problems of enforcing the patent legislation. This concern is heightened by the link of the patenting issue with concentration in the seed industry.

In light of these concerns, we urge that before acting on HR 999, the Congress and the U. S. Department of Agriculture take the following steps:

1. Expand, and adequately fund, the United States gene pool preservation program, and our relationship with related international programs. Recognize, and state, that the patenting program, with the prospect of gene pool shrinkage that it entails, carries with it the responsibility of providing these protections. Explore "living storage" of gene pool resources in natural and agricultural ecosystems, as well as in protected cold storage.

2. Initiate a study of the impact of consolidation in the seed industry, and of the integration of the seed and agri-chemical industries, on diversity and sustainability of agriculture in both developed and developing economies.

3. Assure the public, through a statutory guarantee, that the United States will not now or in the future seek to ban or otherwise restrict the development or protection of nonpatented varieties as is now the practice in parts of Europe.

We thank you for your attention to these matters and hope that HR 999 can be amended to reflect our concerns and the concerns of many others. The resolution of these issues could have a profound effect on shaping the world's future food supply. If the wrong decisions are made now, we may be depriving future generations of a resource that could be vital to their survival.

Sincerely,

Huey D. Johnson
Secretary for Resources

Priscilla C. Grew, Director
Department of Conservation

Robert L. Judd, Director
Office of Appropriate
Technology

cc: (See attached list.)

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TEXAS DEPARTMENT OF AGRICULTURE
REAGAN V. BROWN, COMMISSIONER / P. O. BOX 12847 / AUSTIN, TEXAS 78711
AN EQUAL OPPORTUNITY EMPLOYER M/F

December 19, 1979

The Honorable E de la Garza
House of Representatives
Washington, D. C. 50515

Re: H. R. 999

Dear Mr. de la Garza:

Since July 6, 1979, when I spoke to Mr. Humberto Pena by phone expressing my support for H. R. 999, I have read various newspaper articles which report opposition to the bill. These articles include suggestions and quotes as follows:

> "The tomatoes you grew last summer may be an endangered species; The amendments and the original law will lead to outlawing thousands of varieties of common vegetables; And will create monopolies in the seed industry at a time when many seed companies are being bought out by corporate giants This law threatens the very existence of our major food crops Most crops are impressively uniform genetically and impressively vulnerable."

The gist of these articles disturbs me. I have discussed these articles with several knowledgeable agronomists here in Texas and the consensus is that the inference emanating from these articles can not be supported. It is inconceivable that U.S. Plant Variety Protection and the amendment could be culpable as implied.

A variety of tomatoes or any other crop may be abandoned if replaced by a variety with superior characteristics, but not because of Plant Variety Protection.

No reasonable interpretation of the amendment or the original law indicates a direction toward the outlawing of any variety.

U.S. Plant Variety Protection or the proposed amendment can have little to do with individuals reaching retirement age and selling out nor can possible enhancement of free enterprise business position through mergers etc. be solely influenced by the tatute or the amendment. Such transactions will occur with or without PVP.

The law, along with the amendment, creates an incentive and climate for improvement of our food and fiber crops rather than threaten or diminish our progress in production.

Some of our crops are very uniform and as such can be vulnerable to disease outbreaks. This situation has no involvement with Plant Variety Protection. Genetic diversity is valuable to plant breeders and crop scientists and these professionals have access to germplasm which is useful in the development of crop varieties with improved traits. Plant breeders and crop scientists maintain an awareness of developments involving the production of current varieties. These same professionals stand ready to meet any challenge resulting from specific varietal vulnerability as they have prior to U.S. Plant Variety Protection.

I trust that H.R. 999 will prevail.

Sincerely,

Don Ator
Director
Seed Division

50-509 O - 80 - 18

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AUBURN UNIVERSITY

AUBURN ALABAMA
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SCHOOL OF AGRICULTURE AND
AGRICULTURAL EXPERIMENT STATION SYSTEM

Department of Horticulture

Telephone 826-4842
Area Code 205

I am writing to ask for your support of HR 999 and its companion S 23 which would repeal the 6 crop exemptions of the 1970 Plant Variety Protection Act (PVPA).

The commercial seed business is highly competitive. It may require 10-20 years of plant breeding research to develop a superior crop variety that carries new genes for disease and insect resistance, heat, salt or drouth tolerance, and higher nutritive content, etc. These genes must necessarily be carefully transferred from the related wild species or races to the cultivated species. Obviously such long term basic research is difficult and expensive and is therefore mainly conducted by public tax supported institutions, the state agricultural experiment stations and the USDA.

The case for plant patenting by both public and private plant breeding agencies is thus obvious, namely 1) to prevent piracy by competitors domestic and foreign; 2) to provide additional funds for plant breeding research in the form of royalties and 3) to give incentive and professional status to plant breeders. Those involved in plant breeding research know that this effort is now woefully under supported and would often fail but for the dedication of the individual researchers involved in a given project.

In 1930 plant patent legislation was enacted for vegetatively propagated plants such as fruit trees and potatoes. In 1970 the PVPA was passed to cover seed reproduced varieties of crop plants. However, 6 crops were excluded from coverage by the 'Act': tomatoes, peppers, okra, carrots, celery and cucumbers. Now legislation has been introduced in the congress to eliminate these exemptions.

Recently a nationwide propaganda campaign has emerged against the whole concept of plant patents by the Rural America Fund and the National Sharecroppers Fund, both based in Wadesboro, N. C., and by the Consumers Federation of America, based in Chicago. These people claim that the PVPA is generally bad for American agriculture; that it will lead to monopoly control of the seed business by large conglomerates who have been buying up private family owned seed companies in recent years. They also claim that in Europe similar legislation has led to the legal banning of thousands of the old varieties or land races of our crop plants, thus eliminating them from the genetic germ plasm pool forever.

The takeover of smaller businesses by large corporations has been occurring and will continue regardless of whether the PVPA exists or not. Also, the PVPA does not prohibit the growing by anyone of any variety. Further, patenting of a new variety is voluntary.

Regarding the preservation of germ plasm, the USDA has already established several regional plant introduction stations and also The National Seed Storage Laboratory at Fort Collins, Colorado. What is needed, however, is a greatly expanded program of germ plasm conservation and renewal, with increased financial support by the federal government. Only in this way can our food supply be safeguarded in the future from the ever present potential ravages of disease and disaster.

Sincerely yours,

Walter H. Greenleaf

Walter H. Greenleaf
Ph.D. Plant Genetics
Professor of Horticulture

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HARVARD UNIVERSITY
CAMBRIDGE, MASSACHUSETTS

18 April 1980

Representative Kika de la Garza
Chairman, House Agriculture Subcommittee on
Department Investigations, Oversight and Research
Washington, D. C. 20510

Dear Representative de la Garza,

I am writing in reference to HR 999 which I understand is currently under consideration by your Committee. I have been unable to come to Washington to present my views before your Subcommittee which I understand is holding hearings on this Bill on 22 April 1980, but I am asking that my enclosed statement be made part of the Subcommitte's hearing records, for the concerns reflected in my statement represent opinions that a number of my colleagues and myself feel your Subcommittee should consider in deliberating on the implications of the proposed legislation.

Briefly, I would ask you to oppose the currently proposed legislation for two sets of related reasons: first, the legislation would facilitate the development of large scale control in the private sector over the organization and future development of agriculture in this country and abroad. As past experience has proved, this tendency towards centralized control of agricultural resources in private hands leads to unstable and potentially explosive economic and political conditions, particularly in Third World countries. Secondly, independent of the economic and political implications of this Bill, the proposed legislation would serve to hasten the broader ecological trend towards world-wide genetic variability collapse which looms as perhaps the most serious long-range problem facing mankind next to nuclear war itself.

As an anthropologist and an historian, I have worked extensively in Africa, and there I have witnessed the growing crisis in world agriculture. While on the surface, those favoring this legislation may feel it strengthens the world's capacity to deal with imminent food shortages world wide, I believe, on the contrary, that this kind of legislation would set in place structures that would in the long-term cripple our capacity to meet the world's future agricultural needs and may indeed jeparodize mankind's chances for survival.

In the enclosed statement I elaborate these views and accompany them with extended arguments outlining the larger context within which this legislation would function. It is imperative that your Subcommittee look beyond the particular wording of the proposed ammendment at this stage and examine in detail the implications such legislation would have if it were to be put into operation. I would very much appreciate it if you would include these materials in the Subcommittee's Hearings and give these issues serious consideration as you and your Committee deliberate. The gravity of the issues concerned is such that to make an ill-informed decision at this stage may preclude the possibility of resolving the agricultural problems which already loom on the horizon in the not too distant future.

Thank you very much for your thoughtful consideration.

Sincerely yours,

Timothy C. Weiskel

Timothy C. Weiskel
Andrew W. Mellon
Faculty Fellow
Harvard University

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STATEMENT BY

Timothy C. Weiskel

Andrew W. Mellon
Faculty Fellow
Harvard University

prepared for

THE HOUSE AGRICULTURE SUBCOMMITTEE

ON DEPARTMENT INVESTIGATIONS, OVERSIGHT AND RESEARCH

concerning

HR 999: An Amendment to the Plant Variety Protection Act

(To be included in Committee's Hearings, 22 April 1980)

I am writing to present before the House Agricultural Subcommittee some of the implications of the currently proposed ammendments to the Plant Variety Protection Act. I am trained as an anthropologist and an historian of Africa, and over the last fifteen years I have been working on issues related to agricultural production and social and economic change in Third World countries. While the opinions expressed here are my own, they are nonetheless shared by many of my colleagues in the fields of anthropology and agricultural development, and for this reason I would hope that the House Agricultural Subcommittee would give these views deliberate and extended consideration as it meets to consider HR 999.

In my opinion and the opinion of many who have studied closely the conditions of the food production systems in the world at large, any legislation that creates or extends patent privileges to plant species should be opposed for two sets of related reasons: first, such legislation would facilitate the development of large-scale control in private hands over the organization and future development of agriculture in this country and abroad. As past experience has proved, this tendency towards centralized control in private hands of agricultural resources leads to unstable and potentially explosive economic and political conditions, particularly in Third World countries. Secondly, legislation to create or extend patents to plants would serve to hasten the broader ecological trend towards world-wide genetic variability collapse - a trend which looms as

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perhaps the most serious long-range problem facing mankind next to nuclear war itself. These issues deserve some elaboration.

The Economic and Political Implications of Plant Patenting with Special Reference to Third World Regions:

It is widely acknowledged that many of the world's poorest nations are facing famine, starvation and death for lack of food supplies. Population increases have outstripped food production in many areas, and accelerated urbanization in these same countries has accentuated the need for remaining rural populations to produce increased agricultural surpluses to provide for urban dwellers. In these circumstances the food producing systems in many Third World countries have been strained to their sustainable ecological limits and beyond, and a cycle of over-cropping and under-production has begun to set in, leading in many cases to chronic and increasingly severe food shortages. In the short run, governments in these countries have had to turn to international food assistance programs to meet shortfalls of production while they "buy time" to undertake the necessary reform of their agricultural structures to restore food self-sufficiency.

There are a variety of avenues that are available to countries in this situation to restore their food self-sufficiency, but so far only a few have been tried. Most experts would agree that a long-term strategy for achieving food self-sufficiency requires a combination of land reform measures, the creation of market and credit facilities for peasants, and the application of appropriate technologies suited to specific ecological and environmental constraints. The particular "mix" of policies varies from country to country, but the goal is to revive decentralized peasant production simultaneously to increase output and create rural employment so as to reduce dependency on imported foodstuffs and stem the tide of landless peasants towards urban centers. Although it is widely recognized that a whole series of coordinated policies designed to create these conditions holds the most promising long-range solution to the problem of food self-sufficiency, few countries have implemented the reforms necessary. The reason for this is that such reforms would in most cases seriously challenge the land holdings or business interests of the politically powerful elites in these areas.

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Instead, many governments in the Third World have chosen the seemingly quicker solution of adopting the agrotechnologies based on introducing mechanized production of "high-yield varieties of wheat, maize rice, sorghum, millet, etc. This "Green Revolution" approach appeals to the politically powerful elites in these countries for it does not challenge their dominant position as businessmen or landholders On the contrary given the scale of productive enterprises needed to introduce this technology and the amount of capital investment required to launch it, the "Green Revolution" approach has tended to favor large capital-intensive production, and in this respect it has served to re-inforce the privilege of the existing elites.

What is perhaps more tragic, over time the "high-yield" technological package has not delivered on its basic promise - that is, the provision of more food to more people. Impressive short-term production increases can be cited in individual instances but the statistics often mask the enormous economic and social costs of production and totally ignore the ensuing problems of food distribution within any one country or internationally The need to buy all the fertilizers, pesticides and required mechanical equipment necessary to make the "high-yield" varieties grow often places the countries in question further in debt than previously. The so called "high-yield varieties are in reality "high-cost" varieties. With the escalating costs of petroleum related inputs to agriculture these "high-cost varieties will increasingly receed beyond the reach of all but the richest of farmers. When cost-benefit studies are conducted in detail in countries that have adopted the "high-yield path, it becomes abundantly clear that those who pay the costs are not those who reap the benefits.

Furthermore, the capital-intensive nature of the production package associated with "high-yield" varieties has not created significant levels of rural employment. Indeed, the technological approach often generates a proverty-stricken peasantry that is driven off its land into urban centers to make way for the larger land holdings of the national or international firms that introduce this technology. As the Iranian case proves in recent history and numerous cases from Latin America suggest as well, it is this landless peasantry that can prove to be the most politically volatile segment of the population as it crowds into urban centers in search of the means to survive. To this extent it can be said that "high-yield" agrotechnologies, as they have been introduced in numerous Third World countries have actually exacerbated the social and economic problems they promised to resolve. These problems in turn help to generate the conditions of political instability in Third World countries that have persistantly proved

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embarassing, costly and indeed dangerous to United States national interests abroad.

It is not the business of this Agricultural Subcommittee to dabble in matters of foreign policy. Equally, however, it is not acceptable for this Subcommittee to ignore the broader implications of the legislation it is called upon to consider. Seed companies have a clear vested interest in extending patent controls over plant varieties in order to gain greater control over the marketing of new "improved" strains. Once these patent rights are extended to some foodstuffs it will be increasingly difficult to limit their extention to others, and in many cases the varieties concerned will be those upon which the Third World countries depend for their agriculture. Since the seed companies themselves are being acquired by multi-national petrochemical firms, future research on crop improvement will be finely tuned to coordinate with the development of other agricultural inputs provided by these same companies, including chemical pesticides and fertilizers. As these integrated firms seek to extend their operations abroad in search of profits, Third World countries will be in a very vulernable position. Those that have opted for "high-yield" agro-technologies to meet their short-term food production needs will be in the position of having to accept the entire "package" of technology offered by particular firms.

There are two very important implications of this inevitable - even if inadvertant - scenario. First, Third World countries will be at the mercy of those firms that provide the integrated agrotechnology "packages." Since the seeds will be developed to respond to particular pesticide-fertiliser inputs, it will be impossible for a given country to purchase just one element in the "package". In the first instance, it is conceivable that "miracle" seeds of this sort could be provided very cheaply. Indeed, because profits would be determined by the "package" as a whole, it is even possible that the seeds themselves could be provided free of charge, since it would be possible to recuperate profits on the provision of other agro-inputs necessary to make the seeds grow.

At first glance, it may seem that "free" seeds would be a real "gift" to the Third World countries, but upon closer scrutiny it is clear that to accept such "gifts" a country would place its agriculture in serious dependence upon the multi-natinnal concerned, particularly when it becomes evident that such a country would have to gear its entire agricultural infrastructure (ie. irrigation systems, marketing systems, mechanized implements) to adjust to the

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new "miracle" variety. In analytical terms, the country concerned would become little more than the "hired hand" necessary to plant the seed and assure the return in profit to the multi-national which retained control over all the crucial agricultural inputs. It is possible, in fact probable, that in such a venture the country concerned would have to sell the commodity produced at relatively high rates simply in order to be able to repay the debts it incurred for the inputs. Thus, such a country would increase its overall dependence on foreign agricultural technology and in the process exacerbate the socio-economic disparities between its classes without providing significantly greater food for its expanding population.

This predictable pattern of events highlights the second important implication of legislation extending plant patent rights to private concerns. In the past, crop research has proceeded primarily in publically financed institutes and international crop research institutes financed by the Rockefeller Foundation, the Ford Foundation and various international bodies. The results of the research in these institutes has been freely available to qualified individuals, and many bi-lateral aid programs established between the U.S. and other countries have sought to apply the research findings in these institutes to specific needs in particular regions. Arrangements have been made between nation-states to share advances in technology, and the United States has clearly benefitted from this free access to plant breeding research in the pursuit of its foreign policy in Third World areas.

This situation would be dramatically altered if legislation were to grant exclusive plant patent rights to private concerns. In effect, such legislation would have the consequence of forcing the United States as a nation to abdicate much of its control to multi-national firms over the basic elements of its future foreign policy towards Third World countries. To the extent that fundamental plant genetic research passes from public to private hands, the United States as a nation would be obliged to tailor its international food and agricultural assistance programs to the needs and interests of the multi-national firms that gained control over this technology. This would mean that the United States as a nation would virtually lose the initiative to formulate its own foreign policy. In matters of food and agriculture the United States, no less than the Third World countries themselves, would be left with no other option but to submit to whatever the multi-national firms would be capable(or willing)to provide. In the wake of the international oil crisis, it takes little imagination to see that

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the interests of multi-national firms that control a basic resource do not always coincide with the interests of the American people.

The Agricultural Subcommittee is not called upon to fiddle in foreign policy matters, but it is called upon to consider soberly all the implications of the proposed legislation in HR 999. It may be argued by some that favor this legislation that the limited question of plant patent rights has no direct connection with these broader questions. By the same logic, of course, the particular legal statutes establishing OPEC as an organization had no direct connection with the rise in oil prices or long gasoline lines in the United States. No one would be foolish enough to argue, however, that once it was established, OPEC had no effect on oil prices. The Agricultural Subcommittee now faces a major political decision in considering HR 999. If it passes legislation to extend plant patent rights, it will be establishing the basic legal machinery that will facilitate the development of monopoly control over vital agricultural resources. To do so would mark a fundamental abdication of public responsibility and a flagrant betrayal of public trust.

Ecological Implications of Plant Patenting:

In addition to creating the conditions necessary for the development of OPEC-like cartels in the seed and agricultural petrochemical industries, the proposed legislation would accelerate the erosion of global plant genetic resources. Once again, the issue is not what the strict wording of the legislation permits or does not permit, but rather what the fact of plant patenting in general would encourage, facilitate, and indeed, render inevitable - even if unintended. In this respect the Agricultural Subcommittee must give careful consideration at this juncture not only to the legislation itself, but to the overall context in which this legislation would function.

Ecologists in this country and abroad have been drawing the attention of scholars, scientists and public officials to the growing trend of world-wide plant genetic erosion. The dimensions of this problem are alarming by any standard. Ecologists have estimated that of all the animal species known to have become extinct, more than half have disappeared since 1900. The situation is more alarming concerning plant species. At current rates of extinction, Erna Bennet of the United Nations Food and Agricultural Organization estimates that by 1991 fully three-quarters of all the vegetable varieties now grown in Europe will be extinct. Dr. Norman Myers, wildlife specialist and author of The Sinking Ark, estimates that right now probably at least one plant species is disappearing each day and if the

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current acceleration of extinctions is not checked, mankind will be losing plant species at the rate of one per hour within a few years.

Those, like Secretary of Agriculture, Robert Bergland, who assert that "this phenomenon has no relationship" to this plant patenting legislation are dangerously mis-informed. Clearly, the legislation does not explicitly call for the extinction of crops but equally clearly it establishes conditions that make world-wide crop genetic erosion profitable for private companies It is in the vested interest of such companies to control a larger and larger share of the market. This can and will be done both by edging out smaller seed companies and by massively displacing a wide variety of genetically varried seed materials currently grown throughout the world. If the Agricultural Subcommittee were to pass this legislation, it would be acting to place the increasingly scarce plant genetic resources into the exclusive hands of private firms and this in turn would create conditions where world-wide crop genetic collapse would become extremely profitable. It is unrealistic to expect that companies will voluntarily and collectively refrain from exploiting such profitable possibilities

The analogy with OPEC once again clarifies the implications of HR 999. Many OPEC members began to realize that the most profitable means of obtaining returns on their oil was in fact to restrict production and let market prices rise to advantageous levels for super-profits. Similarly once local agricultural varieties in Third World nations have been displaced by new "high-yield varieties the companies that provide these varieties will be in a position to restrict and control the distribution of the "miracle" seeds upon which these countries as well as the United States will have come to depend) to the point where they can extort super-profits.

Clearly such a scenario is in the vested interest of the seed companies concerned and the petrochemical companies that are acquiring them, but it is diametrically opposed to the interests of the Third World countries, the United States government, the American consumer and generations yet unborn. Third World areas can not long afford such high cost agricultural systems and they will face massive starvation as an alternative. These cond tions themselves, while assuring guarenteed profits for seed companies, nevertheless create unstable political conditions and generate vociferous anti-American sentiment in Third World areas making it enormously difficult for the United States government to conduct a humane and stable foreign policy with these countries. Finally crop genetic erosion, which works for the short-term benefit and enormous profit of particular seed companies, spells disaster on a global scale for long-term world

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crop production. Generations to come will depend no less than we do on the rich variety of crop genetic material in the natural environment. If we act now by this type of legislation to make it profitable to restrict genetic variability and extend genetic uniformity, we are endangering the survival of mankind as a species.

While the immediate indices of this disaster will first appear in Third World areas, the United States will be no less a victim of crop genetic erosion than the Third World itself. The reasons for this are related directly to the highly vulnerable position of American agriculture. While productivity levels appear to be high, the genetic base of American agriculture is dangerously narrow. The United States depends for a large portion of its production on a remarkably few species of plants, and ecologically this is alarming. Ecologist Paul Erlich explains why:

> In nature, plants are engaged in a continuous stepwise evolutionary battle with plant diseases and herbivores. Plants' enemies are always evolving new methods of attack to counter the constantly evolving defences of the plants themselves. Likewise, crops are involved in a "co-evolutionary race" with the pests and diseases that attack them. A resistant crop strain will produce high yields only until one of its attackers evolves a way to overcome the resistance. (Technology Review, (Mar.-Apr. 1980), p. 61)

In short, the structure of American agriculture is crucially dependent upon the continuous development of new crop strains to keep pace in this "co-evolutionary race."

The difficulty is that these new crop varieties cannot be generated out of thin air. The parent strains that contain the basic genetic material to develop new forms of resistant varieties are to be found in natural habitats - many of them in precisely those areas of the Third World that are currently coming under pressure from expanded planting of "high-yield" varieties. As Paul Erlich explains it:

> The raw material the plant breeders must use is genetic variability - variability that was once abundant in the multitudinous strains of crops that were planted all over the world, and in their wild ancestors. But in recent decades, in part as a result of the "green revolution," the number of crop strains has been greatly reduced. In some areas of Turkey, for example, numerous varieties of wheat used to be planted. Now only one "miracle" strain can be found. (Technology Review, (Mar.-Apr. 1980), p. 61)

What is true of wheat in Turkey is in varying degrees true of maize in Mexico, potatoes in the Andes and rice in the Philippines and South East Asia, and the extinction of native varieties in these regions which have historically accounted for the origins of these crops drastically reduces the material available to

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American scientists for future crop development.

Those that favor plant patenting rights are seeking to establish them in order in part to facilitate their expansion into foreign markets. To the extent that seed and petrochemical companies extend the cultivation of their seed varieties into areas of the Third World that contain the primary genetic material needed for future crop research and development, these primary materials will be lost forever in most cases. The problem is a global one, and American agriculture will suffer as much in the long run - indeed, given its vulnerability, perhaps even more - from this process of genetic extinction as will the agricultural systems in the immediate areas concerned in the Third World.

This is not simply a remote academic question or one limited to the pleadings of a handfull of environmentalists. This concerns us all. It transcends partisan politics and supersedes anyone's particular philosophy about the relationship between the private and public sector. It is imperative that public officials act responsibly in the face of this problem not only for the sake of their constituents, or even for America as a whole, but for mankind at large. As Paul Erlich reminds us:

> This decay of real and potential variability of crops is one of the least recognized but most important factors in the deterioration of the human environment. If it goes too far, Homo sapiens will be permanently out of the business of high-yield agriculture which, with the present world population, would be an unprecedented catastrophe....Aside from nuclear war, there is probably no more serious environmental threat than the continued decay of the genetic variability of crops. (Technology Review (Mar.-Apr. 1980), p. 61; and Ecoscience, p. 344) (Emphasis in original)

It is not possible for the House Agriculture Subcommittee on its own to stem the global trend towards world-wide plant genetic erosion. Nevertheless, the Subcommittee has a fundamental obligation to oppose any and all legislation which comes before it that would have the effect of facilitating, assisting or accelerating the trend towards the extinction of plant genetic resources. By extending patent rights to plant varieties, HR 999 effectively creates incentives for seed companies to extend genetic uniformity as they seek to gain control over larger and larger portions of the market with seeds under their exclusive patents. In operational terms, creating or extending plant patent rights inevitably - even if inadvertantly - accelerates the trend towards global crop genetic erosion. In legal terms it may prove impossible to assign "guilt" for individual plant extinctions, but it is clearly evident which parties are

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guilty of facilitating, assisting and making profit from this process as a whole, and it is for this reason that the deliberations of the House Agricultural Subcommittee are being watched with great interest by concerned citizens in academic institutions, scientific research institutes, development agencies, farmers organizations and consumer groups in this country and around the world.

The issue is not the particular wording of the ammendments. Nor is the motivation of those favoring the legislation in question. Seed companies are in business to make a profit, and it is clear that such legislation would grant them wind-fall profits by creating the conditions for them to develop OPEC-like seed and petrochemical cartels. The question before the House Agricultural Subcommittee, however, is clearly whether the vested interests of these companies should take precedence over the real and imminent dangers to the American farmer, the consuming public and the world at large if patents are to be extended over plant genetic material. Further crop genetic research is urgently needed to sustain American and world-wide agricultural systems, but it is a matter of vital importance that this research remain in the public domain and not become the exclusive preserve of private interests. As responsible public officials you are now called upon to reject the extension of plant patent rights proposed in HR 999.

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THE UNIVERSITY OF NEBRASKA–LINCOLN
INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
LINCOLN, NEBRASKA 68583

Reply to:
Department of Agronomy
279 Plant Science
East Campus
(402) 472-2811

Institute of Agriculture and Natural Resources

April 17, 1980

FOR THE RECORD

U.S. House Agriculture
Subcommittee on Department Investigations,
Oversight and Research
Room 1301, Longworth House Office Building
Washington, D.C. 20515
Attention: Ms. Abrams

Reference: Hearings of
April 22, 1980 on H.R. 999.

Dear Subcommittee Membership:

The general consumer in the United States has been the principal benefactor from research programs on field and food crops. The people of no other nation enjoy such a varied, wholesome diet for the time invested in earning it. The price of land and other production inputs have been increasing. Fixed costs frequently represent half of the total costs per acre of production. Only by increasing yields from each acre can the farmer reduce the fixed-cost component for each unit produced.

For most crops the cost of seed is a small part of the total production costs. Still that seed represents the genetic potential to produce high yields, resist disease and insect damage, and provide a desired quality for consumers. How is the genetic potential of seed improved, maintained and delivered to the commercial coop grower? By plant breeding programs and activities of the seed industry. Obviously varieties are the very heart of each crop producer's enterprise.

Variety improvement through plant breeding has been one of the principal means by which the productivity of crop producers has been increased. Probably at least one third of the yield gains in the last half century in corn, sorghum, wheat, soybeans and other field crops can be attributed to variety and hybrid improvement. U.S. agriculture would not have its preeminent place without this component of gain.

Plant Variety Protection is not needed in those crops such as corn and sorghum in which hybrids dominate the use picture. Companies that make investments to develop inbred lines that are combined to produce superior hybrids have built-in protection. They control the lines. Farmers must buy hybrid seed each year to gain the advantages. They cannot reproduce their own.

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Thus, Plant Variety Protection is important only in those crops or plants where the purchaser can reproduce the variety year after year. Soybeans and wheat are two major crops with self-pollination that breed true. Many farmers plant seed from their own production. There was essentially no breeding research by private companies until passage of the Plant Variety Protection Act in 1970. Since then, a substantial private investment has been made. Continuing through the years and complementing the breeding programs of public agencies, this is certain to make better varieties available to producers and help provide food more economically to consumers.

This Act provides that farmers can replant seed they produce from these protected varieties. They are prohibited from advertising and selling under the approved name. This feature provides a degree of protection to the developer to permit recovery of his research investment. It gives individual farmers access to the best of varieties without recourse to purchase of all seed needs each year.

The Plant Variety Protection Act, therefore, permits private investment in crops that would not happen otherwise. History shows that to be true. In my opinion, activities under the Act have essentially no relation to the maintenance of diversity in germ plasms. The consuming public whether in the U. S. or other parts of the world will be the principal benefactors. Major benefits from increased breeding research that the Act permits are just beginning to accrue. The major thrust has been and will continue to be strongly for the public welfare. It should be continued without substantive change.

In my opinion, there should be concern today that support for public agency programs is being permitted to suffer under the effects of inflation and tight budgets. The private investment in breeding research will not replace public investment. It is complementary but not substitutible.

I offer this analysis as strong support for retaining the Plant Variety Protection Act of 1970 without substantive change.

Sincerely,

D. G. Hanway
Professor of Agronomy

P.S. In 1977 I made an assessment of the impacts of the Plant Variety Protection Act an agricultural experiment stations programs. Enclosed is a reprint from Crops and Soils that gives my analysis. D.G.H.

(The reprint referred to above is held in the subcommittee file.)

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STATEMENT OF DONALD Q. INNIS, DEPARTMENT OF GEOGRAPHY, STATE UNIVERSITY OF NEW YORK, GENESEO

I have been researching the accomplishments and problems of traditional small farmers since 1951. I would like to submit the following statement for your consideration in connection with the proposed legislation

Traditional farmers all over the world are also plant scientists. Most of them are constantly on the lookout for disease-resistant or high-yielding varieties When was graduate student at Berkeley Carl Sauer who developed one of the most widely accepted current theories about plant and animal domestication emphasized the importance of "corn explorers who travel the world on behalf of commercial and governmental crop breeding programs to obtain genetic material (developed and constantly being developed by traditional farmers) necessary for developing improved cultivators

The economic advantages of high yield crops, which are dependent on commercial fertilizers are already so great that farmers all over the world are switching to hybrids and high-yield crops where commercial fertilizers are economically available This trend has already reduced the acreage devoted to ordinary crops reduced the acreage where useful new mutations may occur and reduced the numbers of traditional farmers who have a proprietary interest in detecting and encouraging new cultivars. Are seed companies, which hope to benefit from plant patenting laws following the pattern of mining companies and destroying the resources (in this case genetic material) on which they depend?

Valuable mutations with only occur in fields which are not hybrids. The parent stocks which contain the gene patterns and characteristics needed by hybrids, are of course not hybrids

Creation of all new hybrids and high-yield crops depend on the existence of ordinary plants with varied genetic characteristics Mutations are constantly occurring both in plants and in diseases. New diseases are constantly developing which attack plants (hybrid or not) which were previously immune from attack The availability of plant mutations which will provide resistance to new disease mutations cannot come from hybrid fields it must come from the ordinary plants which have been developed by traditional farmers over the millenia. The more ordinary plants there are, the more likelihood there is that useful mutations will occur somewhere. Any attempt to purposefully decrease the availability of ordinary plants seems extremely unwise since this reduces the likelihood that plant breeders will be able to find the disease resistant plant material they need.

Since economic forces have already decreased our access to continuing sources of new genetic material, it seems extremely unwise to add legal forces which would provide an additional handicap in providing the world with the best possible genetic material.

The United States which has done so much to develop hybrid corn and many other hybrid and high-yield crops for the world, must not follow the European example of reducing the amount of genetic variability available. American plant breeders have worked successfully all over the world with plant material made available by small traditional farmers The United States must not take steps to decrease the number of cultivars needed by both large and small farms.

The future of commercial agri-business is doubtful because it depends so much on non-renewable resources Justus von Leibig's seminal idea in 1840 of using mineral fertilizers to increase crop yield is nearing the end of its useful life-span High-yield plants will be less valuable in a world where increasing numbers of farmers are unable to purchase commercial fertilizers Higher costs of energy will steadily increase costs of mining and transportation. Because of the high cost of nitrate fertilizer, several experimental stations in India already carrying out experiments in which legumes provide the needed nitrogen for other crops Traditional farmers, as I know from my own research, have long utilized intercropping, including legumes, to get maximum yields from any given amount of nutrients The plant varieties needed by traditional farmers in the future will not be the same as those needed by agri-business monoculture. Genetic diversity may be even more important in the future than it is now as we become dependent on varieties which best use recycled organic nutrients and species such as cassava whose root secretions seem to be able to make soil nutrients available which are not available to other plants in poor soil areas

The difficult times which lie ahead for the world' farmers as they try to feed the world with fewer commercial nutrients must not be made more difficult by legislation which will discourage the preservation and development of enormous amounts of genetic material.

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PURDUE UNIVERSITY DEPARTMENT OF HORTICULTURE

February 11, 1980

Representative E. de la Garza
Chairman, House Agricultural Committee
on Research
House of Representatives
Washington, DC 20515

Dear Congressman de la Garza:

I am writing to express my concerns and impressions regarding discussions on ammendments to the 1970 Plant Variety Protection Act (HR 999). As a publicly supported vegetable breeder, I join many of my colleagues in voicing support to ammend the 1970 Act to include those crops which were excluded in the original Legislation.

I cannot support the published concern expressed by various groups regarding the impact of this Legislation on genetic uniformity, loss of valuable germplasm, control of seed supplies by "big industry", etc. etc.. Variety protection does not preclude development and/or propagation of unprotected cultivars but simply provides a mechanism to protect investments in research on new variety development. This will undoubtedly increase industry involvement in variety development and "free up" public breeders to devote more effort to "basic genetic research" and long term, difficult breeding objectives, both of which are vital to maximize future progress in plant improvement.

I urge you to consider the practical aspects of this Legislation rather than the misinformed opinions of the large vocal gardening groups who appear to have organized against this Legislation without solid reasons for opposition. I would be happy to provide further input in support of this Legislation to refute several widely published claims opposing variety protection on currently excluded crops.

Sincerely,

E. C. Tigchelaar
Professor of Horticulture

ECT:jz

Horticulture Building
West Lafayette, Indiana 47907
(317) 749-2261

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PURDUE UNIVERSITY DEPARTMENT OF HORTICULTURE

March 21, 1980

Rep. E. de la Garza, Chairman
Committee on Agriculture
U.S. House of Representatives
Room 1301, Longworth House Office Building
Washington, DC 20515

Dear Representative de la Garza:

Thank you for your letter dated February 22 which arrived yesterday. My concern over the misinformation which has been generated by HR 999 has prompted my correspondence, since I feel this legislation will have an important impact on future improvement of the crops in question. Your news release of October 22, 1979 clarifies much of the misinformation which has been propagated and I would hope that the popular press will use this to provide the facts regarding this important legislation.

The mood in many areas of our country today is against large corporations particularly in the agricultural sector. We cannot forget, however, that these large corporations have played and will continue to perform, a vital role in our agricultural and economic development. This legislation will provide the incentive for the private sector, both large and small, to invest in research on variety development and will provide a mechanism to protect that research investment. In the long run, both consumer and producer should benefit.

The concern that this legislation will favor large corporations and prove harmful to "small enterprises" is unwarranted. Variety protection has been available for many years on asexually propagated crops and the majority of patents are held by "small businesses" or individuals. If anything, this protection has favored "small operations" since they have been able to prosper with one or a few unique protected items.

If my comments will prove helpful in clarifying the impact of HR 999, you are welcome to use them as you wish.

Sincerely,

E. C. Tigchelaar
Professor of Horticulture

ECT:jz

Horticulture Building
West Lafayette, Indiana 47907
(317) 749-2261

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Statement By
Leo J. Donahue
American Association of Nurserymen
and
National Association of Plant Patent Owners

Mr Chairman, Members of the Committee, my name is Leo J. Donahue and am Director of Government Affairs of the American Association of Nurserymen (AAN) and Administrator of The National Association of Plant Patent Owners (NAPPO). The AAN is a national trade association comprised of 3000 member firms engaged in the production, marketing and installation of environmental trees and plants. NAPPO is a national trade association comprised of 48 member firms and individuals who hold plant patents and are engaged in the breeding of new varieties of trees and plants. Vitually all our member firms in both organizations are small businesses.

We have followed with interest the hearings on H.R. 999, which would amend the Plant Variety Protection Act, including its expansion to protect six varieties of vegetables not now eligible for protection. Most of the provisions consist of amendments of a technical nature to the Plant Variety Protection Act. These technical changes meet with our approval and have been adequately justified by competent witnesses, so we will address the substantive changes contained in the bil which we also strongly endorse

Section 14 extends the period of protection under a certificate from the present 17 years to 18 years. This will bring U.S law into conformity with the breeders' rights laws of other countries. Additionally, it will satisfy one o the requirements for U.S. adherence to the UPOV Convention.

Section 21 eliminates the existing exemption of six vegetables in the Plant Variety Protection Act This will provide the breeders of these vegetables the same treatment as others and end the existing discriminatory practice It is our understanding that this exemption was included in original law at the request of the large soup companies Further, we understand that these companies now favor the removal of the exemption.

In addition to these changes, a further amendment to the Act which we strongly endorse, has been recommended by Dr. Harold Loden of the American Seed Trade Association. Dr. Loden would amend Section 42(a)(2) of the existing Act, which bars protection of a variety on which an application for protection was filed in a foreign country more than one year before the effective filing of the application in the United States This amendment would change the basis of the bar from the date of application to the date of offering for sale or selling the variety to be consistent with the plant breeders'laws in other countries. This amendment would bring the Plant Variety Protection Act into conformity with similar laws of other countries Also, it would give the United States access to superior seed varieties developed in foreign countries which are not now always available Because the foreign breeders cannot meet the current one year statutory bar in the U S and because of lack of protection, they elect not to market their varieties in our country. We strongly endorse this amendment.

In following the hearings, we have been disturbed by come of the things we've heard. At this point we would like to comment on just a few of these things.

The statement that the enactment of the Plant Variety Protection Act has fostered the acquisition of small seed companies by larger ones, or that any broadening of the Act would be to the detriment of the smaller companies, is not factual Our observation is that the smaller companies, which are usually family held, decide to sell because of the

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extreme tax burden confronting private entrepreneurs. This, coupled with burdensome state and federal estate taxes, often makes it economically advantageous to dispose of a business during one's lifetime. In any event, the Plant Variety Protection Act has had no significant influence on deci ions to sell

The allegation that acquisitions of major U.S. seed companies by multinational corporations has been brought about by enactment of the Plant Variety Protection Act is sheer nonsense. A cursory examination of what has occurred in the world economy during the past 10 to 15 years makes t quite evident that, with the declining value of the dollar in world markets, U.S. business enterprises of all types are the world s greatest bargain. Foreign firms and investors have acquired U.S. properties in all sectors of our economy. Absent a change in the world economic situation, these acquisitions of U S businesses will continue It should be noted at this point that the U.S companies normally remain under U.S management, continue to employ U.S. citizens, and pay U.S. taxes.

Much has been said at this hearing concerning diminution of the number of seed varieties available to today's farmer. At the outset, to place this subject in its proper perspective, one should recognize that a certificate of protection merely grants the holder a right to exclude others from reproducing, using or selling the protected variety. The merit of the variety is not determined by the grant. Rather, it is determined in the marketplace in competition with every other variety, protected or not. Under our free enterprise system, any variety for which there is a market will be reproduced. The diminution of varieties has occurred because of the exceptional performance of new varieties. This has been evidenced in the United States by the success of hybrid seed. The seed industry will invest the necessary money in research and development of new varieties for self-pollinated crops only if this investment can be recouped. This can be accomplished only with a Plant Variety Protection Act. The theory that plants will evolve and develop better defenses against pests and diseases may be accurate, but world history records many periods of famine while waiting for nature to react. We are fortunate in this country that we have not been, nor will we be, confronted with this problem because of our viable seed industry and its large investment in research and development.

Some mention has been made to the effect that the germplasm bank at Fort Collins is inadequate to preserve the varieties stored It is our understanding that, periodically, all seed stored in the bank is multiplied to ensure the continued existence of viable seed.

The allegation that a U.S. seed company obtained certified seed from the Mexican government and proceeded to obtain a breeders rights grant in a European country fails to identify either the company or the country in which the protection was obtained. It is our understanding that breeders' rights laws in European countries provide for revocation of grants grants fraudulently obtained and penalties for those who perpetrated the fraud. Anyone with knowledge of fraud should notify the appropriate authorities. That aside, it is axiomatic that morality cannot be legislated. In the United States, criminal laws provide adequate penalties to discourage fraudulent claims.

In conclusion, we want to reiterate our support for H.R. 999 and the amendment proposed by Dr. Loden of the American Seed Trade Association. t is our judgement that the Plant Variety Protection Act and the proposed amendments are in the best interest o the plant breeders, who will be rewarded for his diligence and research. The Act and proposed amendments are equally beneficial to sharecroppers, tenants and small farmers, who will benefit from varieties giving greater yields and providing greater resistance to pests and disease.

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FOR THE RECORD

Comments for the Subcommittee Record for Hearings on H. R. 999
Amendments to the Plant Variety Protection Act.

By Early C. Ewing, Jr., plant breeder, consultant to Delta & Pine Land Company, Scott, Mississippi. Delta & Pine Land Company has been, since 1915, a developer of improved varieties of cotton and more recently of soybeans and rice.

SUMMARY

This legislation provides a means of increasing the productivity of agriculture while reducing variety development expense of the government. It does not call for an enforcement staff and is in fact designed to be self-supporting. The benefits of this legislation should be afforded growers and consumers of the six exempt vegetables. All users of seed are protected by provisions of the law.

COMMENT

Two keys to the solution of our primary economic problem, generally recognized as being inflation, are an increase in productivity and a decrease in the federal budget.

The Plant Variety Protection Act contributes to the accomplishment of both of these objectives.

Improved crop varieties are one of the most effective and least cost ways of improving crop production. New varieties are the result of intelligent planning, hard work and increasing costs. New techniques and materials, which are the result of fundamental research, are applied in practical ways to meet the constant changes in product requirements and production practices.

The Plant Variety Protection Act, in a way similar to patent and copyright laws, makes it possible for the developer of successful new seed varieties to recover these costs and provide a return to the owners of the business.

By a successful new variety I mean one that gives the farmer an economic advantage and the consumer, through increased productivity, more value for his money.

The prospect of a financial reward stimulates more activity by private plant breeding firms so that less federal expenditure is required. This goal was set forth by Secretary Bergland in a speech to the American Seed Trade Association at Kansas City in 1978.

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THE AMENDMENTS (H. R. 999)

These amendments, with one exception, deal with so-called "housekeeping" details of the law. The exception is to bring under coverage of the law six vegetables (okra, celery, peppers, tomatoes, carrots and cucumbers) which were originally excluded. I don't know the reason for this exclusion, but those objections do not exist today. Other objections have arisen, but I don't believe they have a valid application to the way the law is written and how it actually works.

THE LAW

There are many provisions in the law but eight points are especially important:

1. The application for these rights is purely voluntary--the law doesn't require any developer of a seed variety to do anything unless he chooses.

2. Novelty, not merit, is the basis for granting protection. No agency is set up to decide whether or not something is good; this decision is left to the user of the new variety.

3. Enforcement of the rights is the responsibility of the owner of the rights. It does not involve the expense of a governmental enforcement agency.

4. The person who plants the seed knows it is the authorized product of the developer who is responsible for its quality and performance.

5. The availability of these rights encourages competition. More varietal development is stimulated, it can have more specialized application and stimulates more choices for the grower. In the crops in which we are interested we have in the last ten years as the plant variety protection law became reality seen 8 new cotton breeders, 25 new soybean breeders, and 3 new rice breeders.

6. A most important feature of the law is that it covers a variety but not elements of germplasm or individual characters. In plant breeding most advances are based on the discovery of such new germplasm. This new material whether from public or private sources becomes available to all. Since we have more breeders, our germplasm base becomes wider rather than narrower.

7. In the case of an emergency, the Secretary of Agriculture is empowered to take action to make available adequate supplies of a protected variety.

8. Even though the use of the crop for seed purposes is restricted, the purchaser may use his production for his own seed but not use it in competition with the developer by going into the seed business. This is known as the Farmer Expemption.

Respectfully submitted,

Early C. Ewing, Jr.

April 9, 1980

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LYNKS

BOX 837 MARSHALLTOWN, IOWA 50158 • PHONE 515/752-4628

October 11, 1979

The Honorable E de la Garza
House of Representatives
Washington, D. C. 20515

Dear Mr. Garza:

I wish to call your attention to HR999 in regard to the amendments of the Plant Variety Protection Act. Apparently, testimony against measures in this bill are quite numerous and also quite deceiving.

Continued statements tend to make one believe we will suffer if the six varieties are included in the act and the consumer and small producer will virtually bear all of the burden. Far from it, they will benefit as much or more than those spending heavily on research to develop better foods.

I have been associated with a small company for 25 years. I can honestly say the Plant Variety Protection Act has helped us and our customers immensly. Granted, we have paid a royalty for the use of a patented line but the royalty is insignificant in the total cost of the seed and it is far cheaper than if we had to support a large research staff.

Also, our longtime customers who buy only from us benefit from this research and pay no more for the product than they would from a major company.

I urge you to study the testimony of the American Seed Trade Association and the U.S.D.A. I am sure it will give you the honest views to be considered.

Your efforts on behalf of the seedsmen, both large and small will be appreciated.

Very Truly Yours,

LYNKS HYBRIDS

Earl W. Olson

Earl W. Olson
General Manager

EWO:sl

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"Growing Good Seed Since 1915" MEMBER - AMERICAN SEED TRADE ASSOCIATION

OTIS S. TWILLEY SEED CO. INC.

Breeder and Grower of Selected Seed

Trevose, Pa. 19047 Phone (215) 639-8800

October 16, 1979

The Honorable E de la Garza
House of Representatives
Washington, D. C. 20515

Dear Mr. Garza:

My purpose in writing to you is to provide you with some factual information to allow you to better understand why you should support H.R. 999 and S. 23 regarding amendments to the Plant Variety Protection Act.

First, let me give you some company and personal background. The Twilley Seed Company is a small privately owned and operated seed company. We grow some of our own seeds under our supervision and also buy from other seed growers. We have our own trial ground and are continually looking for new and better vegetable and flower varieties to offer to our customers, which include small to medium size Market Growers, Hobby Gardeners, and Home Gardeners.

My own experience in the seed business spans 33 years, during which time I have been active in the various Seed Trade Associations.

Regarding the Plant Variety Protection Act. This act does not require a grower to protect his variety, it is strictly voluntary. The Act provides only that the variety voluntarily entered for protection under the act by its developermay not be increased for seed and sold for planting purposes commercially without the permission of the developer. This is only fair since the developer has usually spent years and quite a bit of money to develope the variety. Note, this does not effect crops of food, feeds, etc. nor does it effect the Home Gardener. A seed developer does not request protection of a Hybrid under the Act since he can control the reproduction of seed himself since only he the developer has knowledge of the inbreds or parents.

OCT 22 1979

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October 16, 1979

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The only thing the Act does is it attempts to prevent one seed company from stealing and selling someone else's variety.

There has been quite a bit of information put out recently opposed to the amendment of the Act on grounds that the bill as a whole:

A. Limits the exchange of germ palasm
B. Reduces genetic diversity
C. Restricts the choice of varieties that farmers can grow and is generally bad for agriculture
D. Reduce competition
E. Increase seed prices to farmers and gardeners
F. Eventually encourage the demise of family owned seed business
G. Standardize our plant patenting laws with European laws so that the United States can join the International Union for the Protection of New Varieties of Plants.

The above statements are half truths and untruths. The original law and pending amendments will not have any of the above effects, to the contrary it allows for greater choice of varieties and increased competition since it allows even the smaller companies protection for newly developed varieties and not have the larger producers jump in and produce these protected varieties. Thus taking away business from the smaller operators.

The original Plant Variety Protection Act was sponsored and fully endorsed by the American Seed Trade members which is made up of large and small companies. The Plant Variety Protection Act and its amendment pending under H. R. 999 and S 23 are again fully sponsored and endorsed by the members of the American Seed Trade as necessary for the protection of the companies in the seed business.

If this amendment or original bill was not in the interest of the seed industry as a whole and in turn for the general consuming public we would have enlisted your support long ago to oppose it's passage.

We are a small seed house and fully endorse the amendment covered by H. R. 999 and S. 23 and sincerely request your support.

If we can be of any further help to you regarding H.R. 999 and S. 23 please call upon us without hesitation.

Sincerely,

Charles H. Kindsvater
Executive Vice President

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ARNOLD-THOMAS
Seed Service, Inc.

5151 NORTH PALM AVENUE - SUITE 90
FRESNO, CALIFORNIA 93704
(209) 222-5414

October 19, 1979

The Honorable E de la Garza
House of Representatives
Washington, D.C. 20515

Dear Mr. E de la Garza:

I wish to express my concern in regard to the objections which have been raised regarding H.R. 999 pertaining to amendments to Plant Variety Protection Act.

Illegal to grow certain varieties - This is not true. The owner does have exclusive control on protected varieties for 17 years. The Plant Variety Protection Act exerts no control over "unpatented" varieties. Many varieties are released by breeders without requesting protection under the Act.

The Plant Variety Protection Act is not a system of identifying legal and illegal varieties. The European "legal and illegal list of varieties is the National List of Varieties. The National plant variety list a part of Common Market List, restricts the use of certain varieties. These restricted lists are for the protection of the consumer and have nothing to do with protection of individual rights.

The Plant Variety Protection Act does not outlaw growing of cross-pollinated varieties near a commercial farm. Some "plant patents" which specify variety only as a class of certified seed does pose isolation standards on the patent holder as a seed grower but not on adjacent farmers or gardeners.

The lant Variety Protection Act does not encourage uniformity in crops The southern corn blight epidemic occurred before the Plant Variety Protection Act was passed. The Plant Variety Protection Act encourages research which leads to the development of new, non-hybrid varieties and each such variety adds to the diversity of materials (germ plasm) available.

The Plant Variety Protection Act does not cause varieties to become extinct. Varieties become extinct due to availability of new varieties with superior performance because of the superior germ plasm they contain. The seed of replaced (extinct) varieties can be preserved in the National Seed Storage Laboratory in Fort Collins, Colorado Also a recent survey would indicate there are 30 percent more varieties being marketed today than in 1970.

The Plan Variety Protection Act does allow small seed companies to protect their investment in research by affording them protection on the varieties they develop and merchandise. Seven of the larger seed companies have received 7 percent of the certificates issued under the Act. The remainder have gone to smaller companies and experiment stations.

I solicit your support of the passage of H.R. 999 in this session of Congress.

Should you desire further information on any of the points covered herein, please contact:

Harold Loden
Executive Vice President
American Seed Trade Association
Washington D.C.
Telephone: 233-4080

Respectfully yours,

Lloyd E. Arnold

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hollar & company, inc.

BREEDERS AND GROWERS: WATERMELON - CANTALOUPE - CUCUMBER - SQUASH - GOURD
P. O. BOX 106, ROCKY FORD, COLORADO U.S.A. 81067 — TELEPHONE (303) 254-7411
TWX 910-939-1468 (HOLLAR RCKY)

November 6, 1979

The Honorable E de la Garza, Chairman
House of Representatives
Washington, D.C. 20515

Dear Mr. Garza:

As a small company which develops and grows vegetable seed we support the enactment of H.R. 999 and S. 23.

We understand that there has been criticism of these bills on the grounds that the plant variety protection act:

1. Limits exchange of germplasm.
2. Reduces genetic diversity.
3. Restricts the farmers choice of varieties.
4. Favors the large seed companies.

1. Since the passage of the P.V.P., we have continued to exchange germplasm as before. Germplasm, as opposed to commercial varieties is generally released by government agencies which are not affected by the P.V.P.

2. This statement shows an ignorance of the question at hand. Of course, reducing diversity within a variety has been the aim of plant breeders since Mendel. On the other hand, diversity among varieties within a species is promoted, in our opinion, by the P.V.P.

3. Since the P.V.P., we have shifted more emphasis towards plant breeding. More varieties are being introduced by the trade in general. If old favorite varieties suddenly are unavailable it is becuase they have been replaced by superior varieties.

4. As a small company we do not feel that the P.V.P. favors our very large competitors. It protects money that each company invests in development: therefore, each company can invest more money, on their own scale, into the advancement of plant breeding.

We sincerely feel that you should heed the advise of plant breeders in this matter and not that of the home gardener or rural journalist.

Sincerely yours,

HOLLAR & COMPANY, INC.

Larry A. Hollar
Vice President

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Musser Seed Co., Inc.

TWIN FALLS, IDAHO P. O. BOX 1406 (208) 734-2377
351 SOUTH PARK AVENUE WEST 83301

SANTA MARIA, CALIF. P. O. BOX 827 (805) 928-2518
706 SOUTH OAKLEY AVENUE 93456

CALDWELL, IDAHO P. O. BOX 787 (208) 459-8343
1403 CHICAGO STREET 83605

February 28, 1980

The Honorable E del la Garza
House of Representatives
Washington, D. C. 20515

Dear Congressman de la Garza:

I am quite concerned about events which may jeopardize passing of proposed amendments to the Plant Variety Protection Act under House Bill H.R. 999. I and the seed industry as a whole are even concerned about the future of the Act in general.

The argument of the opposition is that foreign conspiracies and giant U.S. corporations are trying to monopolize and control germ plasm (ie., new varieties), thereby controlling America's food basket.

I am a stockholder and an employee in a small size, privately owned vegetable seed company. We spend quite a good sum annually on research to develop new and improved varieties of vegetables for the American consumer. Our only protection against others marketing our developments is the Plant Variety Protection Act. Without the Act development of disease resistant, higher yielding, more adaptable varieties would cease.

The U. S. balance of payments is also inhanced by exportation of our patented varieties.

Another argument against the Act is that only Patented varieties would be sold thereby eliminating any older varieties which might be particularly adaptable to a certain locale, market, or disease problem. Please be informed that over half of our business is of unpatented varieties, some of which were developed as far back as the 19th century. We have enjoyed a fair and decent profit from this production. We are not about to discontinue any variety as long as the demand remains.

As I said earlier, our company is not part of a conglomerate giant which the opponents of the Plant Variety Protection Act are against. We are a small privately owned corporation which feels the passage of house Bill H.R. 999 is a step in the right direction and vital to the best interests of U.S. Agriculture and it's consumers.

Sincerely,

James D. Hoag

JDH/mw

MAR 4 1980

NOTICE — LIMITATION OF WARRANTY AND OF LIABILITY: SELLER WARRANTS THAT THE SEED IT SELLS WILL BE, AT THE TIME OF DELIVERY, AS DESCRIBED ON THE CONTAINER WITHIN RECOGNIZED TOLERANCES. SELLER MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR PURPOSE, OR OTHERWISE, AND IN ANY EVENT LIABILITY FOR BREACH OF ANY WARRANTY OR CONTRACT WITH RESPECT TO SUCH SEEDS IS LIMITED TO THE PURCHASE PRICE OF SUCH SEED. "SELLERS LIABILITY, WHETHER CONTRACTUAL, FOR NEGLIGENCE OR OTHERWISE, IS LIMITED IN AMOUNT TO THE PURCHASE PRICE OF THE SEEDS UNDER ALL CIRCUMSTANCES AND REGARDLESS OF THE NATURE, CAUSE OR EXTENT OF THE LOSS, AND AS A CONDITION TO ANY LIABILITY ON THE SELLERS PART THE SELLER MUST RECEIVE NOTICE BY REGISTERED MAIL OF ANY CLAIM THAT THE SEED IS DEFECTIVE THIRTY (30) DAYS AFTER THE DEFECT IN THE SEED BECOMES APPARENT. SEED NOT ACCEPTED UNDER THESE TERMS AND CONDITIONS MUST BE RETURNED AT ONCE IN ORIGINAL UNOPENED CONTAINERS AND THE PURCHASE PRICE WILL BE REFUNDED.
"WE FURTHER LIMIT TO SUCH PURCHASE PRICE OUR LIABILITY OF ANY KIND ON ACCOUNT OF ANY NEGLIGENCE WHATSOEVER ON OUR PART WITH RESPECT TO SUCH SEED."

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CENTER FOR RURAL AFFAIRS

Post Office Box 405
Phone (402) 846-5428

Walthill, Nebraska 68067
Population 900

March 31, 1980

Honorable E. de la Garza
Chairman
Subcommittee on Department Investigations,
Oversight, and Research
Room 1434
Longworth House Office Building
Washington, D.C. 20515

Dear Congressman de la Garza:

I am writing to express opposition to amendments to the Plant Variety Protection Act of 1970 pending before the Subcommittee on Department Investigations, Oversight and Research (HR 999), and ask that this letter be made part of the record of Subcommittee hearings on these amendments presently scheduled for April 22, 1980.

The proposed amendments would tighten the control which an increasingly small number of large seed companies have over seeds, the source of life. The claims made that patenting leads to increases in the development of new plant varieties is unsupported and I believe unfounded. On the other hand, it is clear that plant patenting contributes to a dangerous and growing trend toward genetic uniformity among our food crops. We are playing with a genetic time bomb for which Congress is being asked to load the detonator.

Moreover, seed patent legislation constitutes a precedent-setting leap of faith by the Congress into the ethically questionable practice of patenting forms of life. More caution should have been shown when the 1970 Act was passed, and greater caution should be shown now as these amendments propose to extend the Act to six new vegetables, lengthen patent coverage, and permit the U.S. to join the International Union for the Protection of New Varieties of Plants, an organization devoted to the promotion of plant patenting laws worldwide.

We urge you to avoid compounding an error, and to protect our seed stock from further monopolizing and genetically dangerous patenting laws.

Sincerely,

Marty Strange

Marty Strange

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GOLDSMITH
SEEDS, INC.
P. O. BOX 1349 GILROY, CALIFORNIA 95020

April 1, 1980

U.S. House of Representation
Committee on Agriculture, Subcommittee on
Department Investigations, Oversight & Research
Room 1301, Longworth House Office Building
Washington, D.C. 20515

RE: H.R. 999

Members of the Subcommittee:

At the time of your investigative hearing on April 22, 1980, pertaining to the proposed ammendments to the 1970 Plant Variety Protection Act, we wish to support the changes that will result by including the six species, carrots, celery, cucumber, okra, pepper and tomato.

Our seed company is a smaller, privately owned, family business. We breed, produce and market both flower and vegetable seed. We consider The Plant Variety Protection Act beneficial, if not more beneficial, to us the smaller privately owned company, as compared to the larger subsidary or publically owned seed companies.

The Act assets the smaller company research dollar by protecting the results of the expense when such funds are at a much lower level than large corporations.

The Act has proven over the past ten years to be a very workable and benefical law to all concerns. As other patent laws have helped to increase technology in our country, so can this form of law assist in the plant variety area.

Sincerely,

GOLDSMITH SEEDS, INC.

Paul T. Orsetti
Manager,
Vegetable Seed Division

PTO/rh

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RAMSEY SEED, INC.

205 STOCKTON ST. • P.O. BOX 352, MANTECA, CA. 95336 • (209) 823-1721

April 7, 1980

U.S. House of Representatives
Committee on Agriculture, Subcommittee on Department Investigation, Oversight & Research
Room 1301, Longsworth House Office Building
Washington, D.C. 20515

RE: H.R.999 - Amendment to the Plant Variety Protection Act

Members of the Subcommittee:

Ramsey Seed Company supports the Legislation now before you as HR 999. We are a Regional Wholesale Seed distributor, selling both public and Proprietory Field Seed varieties. We have more experience in Alfalfa varieties, perhaps than any other item covered by the 1970 P.V.P. Act. Rather than a narrowing of the genetic base, as claimed by some critics, we have today, as a result of Plant Variety Protection Act Incentive, a very substantial increase in numbers of alfalfa varieties as compared to 1970. This increase in numbers of varieties has provided improved disease and insect resistance, higher productivity, and wider adaptability to soil and climatic conditions.

We, can today, offer the farmer, a far better selection to fit his specific needs, than was available 10 years ago. And, our price list reflects insignificant differences between PVP varieties and public varieties produced by USDA or University Plant Breeders both prior to 1970 and since.

The present law has proven beneficial to the consumer and provides incentive to the plant breeder. We certainly support the proposed amendment that adds the crops excluded by the 1970 act.

Sincerely yours,

RAMSEY SEED, INC.

Lou Flanagan

LF/rm

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Johnny's Selected Seeds
Organic Seed and Crop Research

Albion, Maine 04910 U.S.A.
Our New Phone Number
(207) 437-9294

FOR THE RECORD

Att.: Rep. de la Garza
US House Agriculture
Subcommittee on Department investigations, Oversight and Research
Room 1301, Longworth House Office Building
Washington, DC 20515 Att.: Ms. Abrams 4.8/80

Dear Ms. Abrams:

I would like to direct the following comment to Rep. de la Garza regarding HR 999, the amendment to the Plant Variety Protection Act.

We have a basic understanding of the proposed amendment, and of the original Act. We have had more correspondence from concerned customers on this subject than any other that I can remember in my time in the garden seed business. Much of the comment is based on reactions to false reporting, as I am sure you are aware, which is certainly a pity. However, the public concern over touchy issues such as "genetic uniformity","loss of germplasm", etc. cannot be discounted by neglect.

Our stance on the issue, for the record, is basically as follows. We are in favor of the Act, in concept. It provides a method whereby the developer of a new, true-breeding variety can justify the research expenditure. Theoretically the public and the breeder should benefit as a result. Our primary concern is in the area of enforcement. I have faith in the American seed trade that we would not permit enforcement by means of the European method of the "Common Catalog" in order to prohibit sale of so-called "synonym" or "obsolete" varieties. I believe that this method of enforcement is tragic. The American public is concerned, and they should be assured that we would not stoop to such tactics here in the States. Hence, I would like to see legislation to the effect that this type of method of enforcement would not be allowed in the US. This issue of enforcement is a touchy one, and we must determine specific enforcement methods which would not jeaprodize the existence of any of the older varieties.

Our stance on the issue may be particularly interesting to you, as we must consider ourselves one of the "smaller" companies mentioned by opponents of the Act. We hardly feel that our business is in trouble as a result of the Act, but we do have this issue of enforcement as a concern. I would be more than willing to answer any specific questions you may have for us.

Truly yours,

JOHNNY'S SELECTED SEEDS
R.L. Johnston Jr., Pres.

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FOR THE RECORD

THE LAWN INSTITUTE

991 W. 5TH STREET
MARYSVILLE, OHIO 43040
PHONE 513-642-1777

OFFICE OF THE DIRECTOR

April 8, 1980

E. de la Garza, Chairman
U. S. House Agriculture
Subcommittee on Department Investigations,
Oversight, and Research
House of Representatives
Washington, D. C. 20515

Dear Representative de la Garza,

Thank you very much for your communication of March 25. Your intent to arrive at a conclusion fair to all is, of course, most commendable.

Quite simply, a doctrine of fairness would not single out six crop species only to be treated differently than the patent protection all other crops enjoy. Thus we encourage passage of H. R. 999 amending the Plant Variety Protection Act, making that act uniform and fair to all.

In America, and in Europe with its "restricted" lists, patent protection has afforded benefits to lawnseed. Only with such protection is it worth the while for an individual breeder or his employer to launch the expensive search for germplasm, and perfect it into a named cultivar. Without variety protection such investment and years of effort are not an acceptable business risk.

The result of protection has been a wealth of new selections for the public to utilize. These include marked improvements over old "common" types. Rather than diminishing the availability of desirable germplasm, a great deal more has been identified and isolated.

In the case of the six crops currently excepted by the Plant Variety Protection Act, it is unfair to demand of them a perpetual state of mediocrity in order to maintain a pool of germplasm that might or might not be useful in the future. Nor is it fair to penalize progressive seedmen dealing in these crops, by burdening them with what should be a public responsibility, and which, indeed, is being at least in part attended to by the national seed storage facility in Ft. Collins, a new one proposed in England, and many private pools maintained by individual companies.

By allowing progressive breeders to "invent" and select new varieties, which they would be stimulated to do given protection for their invention, you are in no way restricting others from growing and maintaining as many of the older, familiar types as they care to.

I see no reason to assume that by an encouraging development of new patented varieties of the six excepted crops, that there is any reason to expect results other than enlargement and improvement of the germplasm pool. If there are those who feel otherwise, they are quite at liberty to maintain as many of the older selections as they wish, and to market them as they see fit.

We feel certain that your hearings will show overwhelmingly the advantage of a progressive approach to crop breeding, encouraged through equal protection under law to all segments of the industry. Variety Protection has proven itself, and should be accorded the six crops heretofore excepted.

Sincerely,

Robert W. Schery

Robert W. Schery
Director

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FUNK'S G HYBRID
FUNK SEEDS INTERNATIONAL
a Company of CIBA-GEIGY Corporation
1300 West Washington Street
P.O. Box 2911 Bloomington, Illinois 61701
Phone 309/829-9461-TWX 510-352-2505

April 10, 1980

The Honorable E de la Garza
House of Representatives
Washington, D.C. 20515

Dear Mr. de la Garza:

Thanks for your March 25 letter concerning continuing activity by your sub-committee on HR 999. I wrote you a letter last October 12, 1979 which you responded to and I'm sure is in your file. However, to provide easy access, I have included a copy of this letter which I believe states my opinion concerning this legislation.

Further, I was one of many scientists who participated in the early developmental stages of the ideas which were to become the Plant Variety Protection Act. I believe many seed scient sts share my concern to conserve valuable wild and older cultivars which constitute germplasm available which may, at some point, prove useful in supplying man with food and fiber. I favor legislation and other activities which will encourage preservation of these valuable sources of genetic variability.

I firmly believe that the Plant Variety Protection Act and the amendments embodied in HR 999 in no way endanger the vital need to preserve and protect available genetic variability in mportant plant species. Certain countries have developed systems which require registration and approval of cultivars before they can be produced, distributed and sold. In some cases, a form of Breeders' Rights is involved in the regulations. Most U.S. seedsmen and many seed scientists have been opposed to this type of system. We do not believe the U.S. Plant Variety Protect on Act in any way prohibits or threatens our freedom to produce and sell all nonprotected seed cultivars, old and new.

I again solicit your support in the passage of this important legislation and thank you for keeping me informed. You will note that I am sending a copy of my letter to you to the other members of your sub-committee.

Sincerely,

FUNK SEEDS INTERNATIONAL

Lorin Jump
Manager Foundation Seed and
Seed Production Research

LJ/kh
CC: Sub-committee
ENC:

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FUNK'S HYBRID
FUNK SEEDS INTERNATIONAL
a Company of CIBA-GEIGY Corporation
1300 West Washington Street
P.O. Box 2911 Bloomington, Illinois 61701
• Phone 309/829-9461 • TWX 510-352-2505

FILE COPY

October 12, 1979

The Honorable E de la Garza, Chairman
House of Representatives
Washington, D.C. 20515

Dear Mr. de la Garza:

I am writing asking your support for HR999. This legislation will make certain needed improvements by amending parts of the Plant Variety Protection Act. In addition, it will do away with the present exemption of six species of vegetables.

Considerable opposition has developed to this legislation and, in fact, to the entire Plant Variety Protection Act. It's my feeling that much of the opposition is based on lack of complete information and understanding as to what Plant Variety Protection has contributed and the amendment will accomplish. My career has been devoted to plant breeding and seed technology and, based on my experience, I believe the Plant Variety Protection Act has favored development of new and superior varieties of many different flowers, vegetables, and field crops. The Act has encouraged individual breeders small companies and of course, large companies to invest considerable resources to developmental research designed to introduce new and improved varieties.

In no way does this legislation prohibit distribution and sale of any unprotected variety. "Old" varieties (developed prior to PVP) or varieties which have been developed by those who do not seek protection can be and are distributed and sold by reputable seedsmen. All varieties are only successful if they have superior traits which create a demand for them in the market place. If he chooses to protect his variety, the inventor has added opportunity to recoup his research and development investments.

The ASTA has developed excellent background information on Plant Variety Protection and how it has helped consumers and seedsmen. If you require further information on the Plant Variety Protection Act and the amendments may I suggest that you contact: Dr. Harold Loden, Executive Vice President of the American Seed Trade Association, Inc., 1030 15th Street, N.W., Washington, D.C. 20005.

In addition, there are many administrators and scientists within the USDA, land grant colleges, and other public institutions which can also provide evaluations and information on Plant Variety Protection.

In summary, I request your thoughtful consideration of this bill and urge you to support it.

Sincerely,

FUNK SEEDS INTERNATIONAL

Lorin Jump

Lorin Jump
Manager of Foundation Seed
and Seed Production Research

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STAN ROLLIN
SEED CONSULTANT
6802 OREM DRIVE
LAUREL,MD.20810
April 10, 1980

The Honorable E.de la Garza
Chairman, Sub-Committee on
Investigations, Oversight and Research,
Committee on Agriculture,
House of Representatives,
Washington, D. C. 20515

Dear Congressman E. de la Garza,

As I am convalescing from recent surgery, I shall probably not be able to attend the hearing scheduled for April 22 on H. R. 999, to amend the Plant Variety Protection Act. Therefore, I am submitting my views in writing for the record.

I favor passage of the bill H. R. 999 as introduced in the House with one additional amendment. As the first Commissioner of the Plant Variety Protection Office (1970-1977), I am well aware of the various minor housekeeping changes that are necessary to bring the Act into line with more efficient procedures in operating under the Act.

Of primary importance, is the repeal of Section 144 of the Act in order to allow plant breeders of six named vegetables the same rights as are accorded to plant breeders of all other seed-reproduced crops. The present wording of the Act has been impossible to defend. In my opinion, it is unwarranted discrimination against the plant breeders of these six vegetable crops.

The additional amendment referred to above is the need to amend Section 42(a)(2) of the Act to allow applicants from 4 to 6 years after the first sale in a foreign country to apply for protection in the United States on the same variety. The limit of one year for sale in the United States would remain in effect as at present. This proposed amendment is not now a part of H. R. 999.

In my opinion, there should be no such limitation prior to making an application for rights in a foreign country; however, as the International Union for the Protection of New Varieties of Plants (UPOV)has in its Convention set a limit of 4 years(or 6 years for woody plants), it seems reasonable that the United States should conform at this time in the event the United States should, in the future,decide to become a member of UPOV.

If this proposed additional amendement is not accepted as part of the present bill and adopted, the farmers in the United States may find that some superior varieties developed and protected in foreign countries will not be available to them. Developers of such varieties in foreign countries who cannot comply with the present one-year limitation will not wish to market their variety in the United States without protection under the United States Act.

Respectfully yours,

Stan Rollin

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BODGER SEEDS, LTD.
DIVISION OF JOHN BODGER & SONS CO.
TELEX 88-1811. CABLE: BODGER EL MONTE
TELEPHONE: 442-6161 AREA CODE 213
BOX 5090, EL MONTE, CALIFORNIA, U.S.A. 91734

April 11, 1980

The Honorable E de la Garza
House of Representatives
Washington, D.C. 20515

Dear Mr. de la Garza:

This letter is to support the proposed amendments to the Plant Variety Protection Act which are due to be discussed April 22, 1980.

Our company can be characterized as a small seed company. We do, however originate quite a number of new varieties and depend upon the Plant Variety Protection Act to allow us to compete satisfactorily with large seed companies. In our opinion the act is essential to the seed industry and the amendments should be passed without change.

It has been charged that the Plant Variety Protection Act reduces the number of varieties in circulation and somehow damages the public value of plant material. We feel that it is exactly the reverse: The act encourages new developments in plants and expands the amount of germplasm available to breeders.

We are strongly in favor of the amendments to the Plant Variety Protection Act and the philosophy of the act itself. We urge you to keep it and the amendments intact so that companies like ours can continue to serve the public as we have in the past.

Yours cordially,

BODGER SEEDS, LTD.

President

Howard Bodger
HB/st

SEALING ORIGINATED BY BODGER AS PART OF THE CONTINUOUS RESEARCH WITH WHICH THIS COMPANY HAS SERVED THE WHOLESALE FLOWER SEED TRADE SINCE 1889

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CALIFORNIA SEED ASSOCIATION

Executive Office:

510 Bercut Dr., Suite H Sacramento, CA 95814 (916) 441-2251

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Neuman Seed Co.
P. O. Box 1530
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Field Seed Section)
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P. O. Box 668
Isleton, 95641

TOM CASTLE
A. L. Castle, Inc.
P. O. Box 877
Morgan Hill, 95037

Executive Vice President
LEE ADLER
Sacramento

April 11, 1980

Ms. Abrams
U. S. House Agriculture
Subcommittee on Department
Investigations, Oversight
and Research
Room 1301, Longworth House
Office Building
Washington, D. C. 20515

RE: H.R. 999 - Amendment to Plant Variety Protection Act.

Dear Ms. Abrams:

The California Seed Association supports the legislation now before you as H.R. 999.

The proposed change in the 1970 Plant Variety Protection Act, to include the six species of vegetables which are now excluded, will result in continued improvement and achievement of vegetable varietal development.

Our association represents the majority of vegetable seed companies within the state. It includes both large and small corporations and companies. We consider the present law and proposed amendment to be beneficial to all companies who may develop varieties, regardless of size.

Sincerely yours,

CALIFORNIA SEED ASSOCIATION

Ian Lockhart

Ian Lockhart
President

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QUALI-SEL, INC. Established to Fill a Need
SALINAS, CALIFORNIA 93906 • 11 W. LAUREL DRIVE • SUITE 125 • TELEPHONE (408) 443-1013

April 11, 1980

U.S. House Agriculture
Subcommittee on Department Investigations
Oversight and Research
Room 1301, Longworth House Office Building
Washington, D.C. 20515

Attention: Ms. Abrams

On April 22, the House Committee on Agriculture, Subcommittee on Department Investigations, Oversight and Research, will conduct hearings on the proposed amendments to the Plant Variety Protection Act. We support the amendments that would add six vegetable types to the Act.

The Plant Variety Protection Act has had a tremendous effect on the seed industry, which has resulted in improved yields, better quality and improved adaptability of some vegetable seed items. In a world that is experiencing greater demands for food, this law is certainly a step towards solving or alleviating this major problem area.

We urge the committee's support for the proposed amendments.

Sincerely yours,
QUALI-SEL, INC.

Nathan J. Olivas
President

c: Mr. E de la Garza, Chairman
Mr. George E. Brown, Jr. (Texas)
Mr. Floyd Fithian (Indiana)
Mr. Ike Skelton (Missouri)
Mr. Dan Glickman (Kansas)
Mr. Glenn English (Oklahoma)
Mr. William C. Wampler (Virginia)
Ms. Margaret M. Heckler (Massachusetts)
Mr. Charles E. Grassley (Iowa)

NJO/bb

TWX 9103687362 A [illegible] QUALI-SEL

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Asgrow Seed Company
subsidiary of The Upjohn Company

San Antonio, Texas 78211

P.O. Drawer A

April 14, 1980

The Honorable E. de la Garza, Chairman
House of Representatives
Washington, D.C. 20515

The Plant Variety Protection bill passed in 1970 excluded from coverage six vegetable species. Since then two bills, H.R.999 and S.23, were introduced into Congress in 1979 to amend PVP Act to extend coverage to these six species.

I sincerely request your support for the two bills to extend PVP coverage to the six species as a matter of equity.

Yours very truly,

J. Clifton Smith
Manager, Research
Southwestern Breeding Station

FOR THE RECORD

Asgrow Seed Company
subsidiary of The Upjohn Company

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Henry Harms Jr

Henry Harms, Jr.
Texas Production
Branch Manager

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J. Clifton Smith

J. Clifton Smith
Manager, Research
Southwestern Breeding Station

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A. L. CASTLE, Inc.

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Telex: 352040

FOR THE RECORD

April 15, 1980

The Honorable E. de la Garza, Chairman
House of Representatives
Washington, D. C. 20515

Dear Mr. E. de la Garza:

Legislation should be designed to serve the public as a whole, not for a select few.

Approval and passage of H. R. Bill 999 would be a Statesman approach to serving All our people, the poor, the rich, the large and the small companies.

Passage of H. R. Bill 999 is of economic necessity for the small fresh market grower, the home gardener, the large fresh market produce grower, the processing industry, the export trade, large corporate farmer, the lonely widow living on a very limited income, the plant breeder, the State and Federal Agricultural Experiment Stations.

Climatic areas and the market areas served demand many different varieties in most all vegetable crops. Without complete Variety Protection, scientists and plant breeders are reluctant to spend the money necessary to develop the needed new varieties. Passage of H. R. Bill 999, would not only encourage the development of needed new varieties to replace older less productive varieties, but would also be good Legistative House Keeping for the benefit of all segments of our complex society. We (I) urge your support and passage of Bill H. R. 999.

Yours truly,
A. L. CASTLE, INC.

Willis C. Moore

Willis C. Moore
Director of Processor Relations

cc: U.S. House Agriculture
Subcommittee on Department
Investigations

WCM/ian

"Service makes the difference"

WE WARRANT TO THE EXTENT OF PURCHASE PRICE THAT SEEDS WE SELL ARE DESCRIBED ON THE CONTAINER WITHIN RECOGNIZED TOLERANCES
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Waterman-Loomis Company

P. O. Box 9369 • Bakersfield, California 93309 • (805) 327-4491

April 15, 1980

U.S. House of Representatives
Committee on Agriculture, Subcommittee on Department
Investigations, Oversight & Research
Room 1301, Longworth House Office Building
Washington, D.C. 20515

RE: H.R. 999 - Amendment to Plant Variety Protection Act.

Members of the Subcommittee:

The California Seed Association Supports the legislation now before you as H.R. 999.

The proposed change in the 1970 Plant Variety Protection Act, to include the six species of vegetables which are now excluded, will result in continued improvement and achievement of vegetable varietal development.

Our association represents the majority of vegetable seed companies within the state. It includes both large and small corporations and companies. We consider the present law and proposed amendment to be beneficial to all companies who may develope varieties, regardless of size.

Sincerely yours,

WATERMAN - LOOMIS

Dean Urmston
Vice-President
Marketing

DU:sr

CONTRACT PROVISIONS: This writing is the complete and exclusive statement of the terms of the agreement.
DISCLAIMER AND LIMITATION OF WARRANTIES AND CONDITIONS OF SALE: Subject to the disclaimers, limitations, and conditions agreed upon by the parties and set forth below, Waterman-Loomis Company warrants that the seeds it sells will be, at the time of delivery, as described on the container, within recognized tolerances. THE PARTIES AGREE THAT THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER REPRESENTATIONS AND WARRANTIES ARE EXCLUDED FROM THIS TRANSACTION AND SHALL NOT APPLY TO THE GOODS SOLD.

THE PARTIES AGREE THAT THE LIABILITY OF WATERMAN-LOOMIS COMPANY IS LIMITED TO THE PURCHASE PRICE OF THE SEEDS REGARDLESS OF WHETHER THE CLAIM IS BASED UPON CONTRACT, NEGLIGENCE OF WATERMAN-LOOMIS COMPANY, STRICT LIABILITY, DEFECTIVE OR DAMAGED GOODS, OR ANY CAUSE WHATSOEVER, AND REGARDLESS OF WHETHER ANY ALLEGED DEFECTS IN THE PRODUCT ARE LATENT OR DISCOVERABLE. THE PARTIES AGREE THAT IN NO EVENT, INCLUDING THE CASE OF A CLAIM OF NEGLIGENCE, SHALL WATERMAN-LOOMIS COMPANY BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

The parties agree that all claims, including claims for alleged defective seeds, must be made in writing and received by Waterman-Loomis Company within 10 days after Buyer learns of the facts on which such claim is based, or in any event within one year of date of sale, or the claim shall be deemed waived. The seeds sold by Waterman-Loomis Company may not be sold for human consumption.

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OHIO SEED Improvement ASSOCIATION

6150 Avery Road, Box 477 Dublin, Ohio 43017

OFFICE HOURS: MON-FRI 7:30 AM - 4:30 PM Telephone 614-889-1156

Officers
JAMES NISSE — President
BOBBY L. RUPP — Vice President
ROY O. BECKER — Secretary-Manager
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RAYMOND RITTERMAN — Mt. Sterling
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GORDON RYDER — Columbus
D. WILBUR WILLIAMS — Wilmington

April 15, 1980

U. S. House Agriculture
Subcommittee on Department Investigations,
Oversight, and Research
Room 1301,
Longworth House Building
Washington, D. C. 20515

Attention: Ms. Abrams

Dear Committeemen:

This communication is to inform you that the Ohio Seed Improvement Association which is the Official seed certifying agency for the State of Ohio, wishes to go on record as supporting the amendments to Plant Variety Protection Act, contained in HR 999.

These amendments are basically housekeeping items, but do contain the addition of the six vegetable kinds that were originally excluded from the Act. Those companies and individuals who have originally voiced some opposition to the inclusion of the six vegetable kinds, now have a change of mind and have decided that it would be a good thing for them as well as for the public in general. We support this position.

The proposed amendments also contain a change which affects certification through Title 5. This is also beneficial for all the certifying agencies.

We are aware that you have had some opposition voiced by some minority parties who have spread misconceptions as to what plant variety protection does. Loss of germ plasm, keeping homeowners from planting tomatoes in their backyard, etc., is a bunch of "hog wash". This does not happen, and being the intelligent people that you are, careful reading of the Act will tell you this. Our Association unequivocally supports the passage of these amendments.

Sincerely,

Roy O. Becker
Secretary-Manager

ROB/za

Association of Official Seed Certifying Agencies

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TELEPHONE
Phone 000—000-0000
TLX 000-000

GREAT WESTERN SEED COMPANY

SUBSIDIARY, LOFT'S PEDIGREED SEED COMPANY, BOUND BROOK, NEW JERSEY
NINTH and JACKSON ST. · P.O. BOX 387 · ALBANY, OREGON 97321

PROCESSORS PACKAGERS AND SHIPPERS OF WESTERN GROWN FIELD SEEDS

C. M. "BROWNIE" BROWNELL, Vice President & General Manager
STEVEN P. TUBBS, Purchasing & Sales Manager
DAVID J. HAYES, Production/Research Agronomist

FOR THE RECORD

April 16, 1980

The Honorable Congressman,
E. De La Garza
U.S. House Agriculture
Subcommittee on Department Investigations,
Oversight and Research
Room 3101, Longworth House Office Building
Washington, D.C. 20515

Dear Congressman E. De La Garza:

SUBJECT: Plant Variety Protection Hearings.

I would like to enter for the hearing record, the following comments:

1) The present act totally discriminates against the plant breeders of the six vegetable crops named. It would appear to me that no law should be passed which included discrimination and was probably an oversight in the initial drafting of the act. For this reason I favor passage of bill H.R. 999 and the repeal of Section 144 to accord plant breeders of all vegetable crops the same rights and privileges.

2) Since January 1979 I have requested the House and Senate to include an additional change to the Plant Variety Protection Act. This would be an opportune time to bring the whole act up to date. I enter for the record, the attached letter addressed to the Secretary of Agriculture, dated January 31st, 1979. The Secretaries reply dated March 6th, 1979.

It has been now determined this must be changed by ammending the act rather than by regulation. You will have a file support from all the major seed organizations including Oregon Seed Trade Associate, Pacific Seedman's Association and the American Seed Trade Association.

I therefore reconfirm my support of both ammendments.

Respectfully,

GREAT WESTERN SEED COMPANY

David J. Hayes
Production/Research Agronomist

APR 2 1980

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Phone 503—926-58
TLX 360-280

GREAT WESTERN SEED COMPANY
SUBSIDIARY: LOFT'S PEDIGREED SEED COMPANY, BOUND BROOK, NEW JERSEY
NINTH and JACKSON ST. · P.O. BOX 387 · ALBANY, OREGON 97321
U.S. PACKAGERS AND SHIPPERS OF WESTERN GROWN FIELD SEEDS

C. M. [illegible] HANFLL, General Manager
W. H. [illegible] Assistant General Manager

January 31, 1979

Secretary of Agriculture
U. S. Department of Agriculture
Washington, D.C. 20250

Dear Mr. Secretary:

As a delegation representing the United States at a Diplomatic Conference in Geneva, Switzerland, on October 23, 1978, signed the International Convention for the Protection of New Varieties of Plants (UPOV), it is requested that the regulations and rules of practice under the United States Plant Variety Protection Act (7 U. S. C. 2321 Et Seq.) be amended as soon as possible to reflect the requirements of the aforesaid convention.

We are particularly interested in seeing section 180.7 (a) (7) amended as the present wording is restricting the entry into the United States from foreign countries of varieties protected in those countries more than one year before filing for protection in the United States. This one year limitation between obtaining rights in a foreign country and making application for rights in the United States is impractical and acts as a bar to superior varieties being made available to U.S. farmers.

Foreign owners refuse to export to the United States protected varieties less their varieties can also be protected in the United States. There appears to be no logical reason for barring protection of a foreign protected variety never before marketed in the United States, regardless the time has been protected elsewhere. However, since Article 6 (1) (b) (ii) of the UPOV convention sets a 4 to 6 year limit for offering for sale or marketing in a foreign country before applying in another country, we would suggest that section 180.7 (a) (7) of the regulations and rules of practice under the Plant Variety Protection Act be amended to read as follows:

"(7) he or his privies have not offered for sale or marketed the variety in a foreign country for longer than six years in the case of vines, forest trees fruit trees and ornamental trees, or for longer than four years in the case al other plants.

We interpret section 42(b) of the Plant Variety Protection Act to permit the Secretary, by regulation, to extend, for a reasonable period, the time for filing established in section 42 (a) (2) of the Act.

Your early consideration to this request will be greatly appreciated.

Sincerely yours,

GREAT WESTERN SEED COMPANY

David J. Hayes
Production/Research Agronomist

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UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

WASHINGTON, D.C. 20250

March 6, 1979

Mr. David J. Hayes
Great Western Seed Company
Ninth and Jackson Street
P.O. Box 387
Albany, Oregon 97321

Dear Mr. Hayes:

This is in response to your letter of January 31 to Secretary Bob Bergland concerning your suggested amendments to the regulations and rules of practice under the Plant Variety Protection Act to conform with the requirements of the International Convention for the Protection of New Varieties of Plants (UPOV).

In our opinion your interpretation of section 42(b) of the Act is correct. The Secretary, by regulations, may extend the time for filing as established in section 42(a)(2).

We will make the necessary changes to comply with the wording of Article 6 (1)(b)(ii) of the UPOV convention along with other required amendments. These amendments will be made as soon as possible.

Your interest and comments are appreciated. Be assured that these proposed changes will be discussed with your seed industry.

Sincerely,

Thomas H. Porter

Thomas H. Porter, Acting Director
Livestock, Poultry, Grain, and Seed Division

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KEYSTONE SEED COMPANY, INC.
Subsidiary Union Carbide Corporation
KEYSTONE VEGETABLE SEEDS
P.O. BOX 1438 □ HOLLISTER, CALIFORNIA 95023
(408) 637-5781 □ TWX: 910-590-0459

April 16, 1980

U.S. House Agriculture
Subcommittee on Department Investigations,Oversight
and Research
Room 1301, Longworth House Office Building
Washington, D.C. 20515

Attn: Ms. Abrams

Dear Ms. Abrams:

Following are some comments that I wish to be read into the hearing record on proposed ammendments to the Plant Variety Protection Act that is scheduled for April 22.

I have been a plant breeder, working only with vegetables for the past 32 years. All of my work has been within the private sector and has been centered around celery, onion, lettuce and sweet corn.

I am best known for my work on celery and I don't believe that I would be too forward in stating that when taking into consideration almost any green variety of this species currently produced in the United States today, I have, in some manner contributed to its development.

This should qualify me to speak for the inclusion of this species into the Plant Variety Protection Act as well as to speak for the act itself in stating the following points.

1.) Celery is a biennial species thus it requires a 15 month period from a seed planted to harvesting seed from the plant that grew from the planted seed. However, in breeding this species, which requires selection pressure being exerted upon it at the "market" stage,its life cycle requires a full two years per generation.

2.) In a planned breeding program, the minimum time to an expected success would be in the F6 generation after a cross is made or twelve years. Accordingly, a celery breeder invests a great amount of his life and his sponsor, whether public or private, invests a great amount of money in celery breeding before a return is realized.

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3.) Celery is not a major vegetable species compared to other salad vegetables such as lettuce, tomato or onion and it is certainly a very minor species when compared to staple crops like potato and the grains. Thus, large quantities of seed is not required each year by the farmers that produce celery for the market.

4.) Long term breeding requirements, coupled with low volume makes this pec es rather unattractive for either public or private nvestment In the U.S. today these are only 6 active celery breeders that I know of and of these only 2 are in the mainstream of variety improvement and 1 more is just now beginning.

5.) Today, a competitor without any investment of time or money and probably without even having a plant breeding staff, can offer one of my ce ery developments to the trade at the very same time my company could, if I did not go to great lengths to do all my work in great secrecy. This need for secrecy thus impedes progress since I must be very reticent about revealing findings I have made and knowledge I have of this species even to public breeders.

6.) The idea of a patent, which Plant Variety Protection is a similar entity, is to provide a means by which a discovery can be made public and still provide a means for the discoverer to recover some of his investment used in making the discovery. Since the Plant Variety Protection Act provides for the freedom of usage of protected varieties for breeding purposes it in no way impedes or restricts the use of plasm I may release as a variety but at the same time, I will be willing to release the material as soon as Plant Variety Protection becomes imminent rather than waiting for secret testing to be done and sales promotion efforts to be put into effect as is done now without protection. This usually requires a period of at 2 and sometimes up to 4 years which is quite a saving of time for another celery breeder.

7.) I would like to say that, philosophically, all of my plant breeding efforts are for the greater good of mankind but it is not true; I admit that the impetus behind my efforts is personal gain and I am sure that this is a truism for anyone who accomplishes or develops anything.

Respectfully submitted,

KEYSTONE SEED COMPANY, INC.

Phillip E. Hill

PHILLIP E. HILL
Research Director

PEH/aj

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Asgrow Seed Company
subsidiary of The Upjohn Company

P.O. Box 1087
Tracy, California 95376

April 17, 1980

FOR THE RECORD

U. S. House of Representatives
Committee on Agriculture, Subcommittee on Department Investigations, Oversight & Research
Room 1301, Longworth House Office Bldg.
Washington, D.C. 20515

RE: H.R. 999 - Amendment to Plant Variety Protection Act.

Members of the Subcommittee:

The Asgrow Seed Company supports the legislation now before you as H.R. 999.

To include the six species of vegetables, now excluded, which the proposed change in the 1970 Plant Variety Protection Act will do, will result in the progressive improvement in vegetable varietal development.

Asgrow Seed Company, a member of the California Seed Association (a group made up of large and small corporations and companies) considers the present law and the proposed amendment to be of benefit to any company which may develop varieties, regardless of the size of that company.

Sincerely yours,

Robert J. Silva
Regional Sales Manager
Vegetable Seed Division
Western Region

RJS/ns

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Associated Hybrid Producers
Cooperative Service
(INC.)
An Association of Independent Producers
of Quality Hybrid Seed Corn

PHONE HUDSON: 319-988-4888
Cable Address: Agriport
Telex: 465431

OFFICE OF THE SECRETARY
Hudson, Iowa 50643
P.O. Box 206

April 17, 1980

U. S. House Agriculture Sub-Committee
on Department Investigations, Oversight
and Research
Room 1210
Longworth House Office Bldg.
Washington, D. C. 20515

Attention Mr. M. S. Abrams

Gentlemen:

It is my understanding that hearings have been called on HR 999 for April 22, 1980.

I hereby want to go on record for strongly supporting the passage of HR 999. This will include the six vegetable kinds which were originally excluded from the Act because of large opposition from the vegetable packers. It is my understanding that opposition no longer exists, and that the companies which were opposed will no longer offer opposition to these six vegetable kinds in things to be covered by the Plant Variety Act.

The other items in the Bill are largely housekeeping items which are needed to keep the Plant Variety Protection Act operable under today's laws, regulations and conditions. We are representing 22 companies which produce hybrid seed corn, as well as merchandising soybean seed and other agricultural seeds. We firmly endorse HR 999 and ask that it be pulled from the Sub-Committe for action by the full Committee for passage.

The opposition which was offered last Summer is without foundation, and we ask that you recommend this Bill be taken out of the Sub-Committee for passage as promptly as possible.

Very truly yours,

George M. Strayer md
ASSOCIATED HYBRID PRODUCERS
George M. Strayer, President

GMS/md

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Indiana Crop Improvement Association Inc.

3510 U.S. 52 SOUTH
LAFAYETTE, INDIANA 47905

PHONE (317) 474-3494

April 17, 1980

U. S. House Agriculture
Subcommittee on Dept. Investigations,
Oversight & Research
Room 1301, Longworth House Ofc. Bldg.
Washington, D. C. 20515

Attn: Ms. Abrams

Dear Ms. Abrams:

I would like the following comments to be submitted for the record of the subcommittee hearing scheduled for April 22, 1980, in regard to H.R.999.

I am Larry Svajgr, Director of Seed Certification and Executive Secretary of the Indiana Crop Improvement Association. The Indiana Crop Improvement Association is designated as the official seed certifying agency for the state of Indiana.

On behalf of myself and the members of the Indiana Crop Improvement Association, I urge this committee to vote favorably with regard to H.R.999 which contains the proposed amendments to add the six vegetable kinds that were originally excluded from the Plant Variety Protection Act as well as take care of certain housekeeping items.

There is no question in my mind that the benefits of the Plant Variety Protection Act have been and will continue to be significant in helping to improve agriculture all across America. The Plant Variety Protection Act provides individuals or seed companies a tool which most definitely helps motivate the development and release of improved crop varieties. The numbers of plant breeders and money for crop variety development have increased significantly since the beginning of variety protection. This already has and will continue to result in benefits, not only to farmers, but also to consumers in the United States and around the world.

Again, I urge this subcommittee to take favorable action with regard to H.R.999.

Thank you for the opportunity to submit these comments.

Respectfully submitted,

Larry Svajgr
Executive Secretary
Ind. Crop Improvement Association

LS/pjh

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AGWAY INC., BOX 4933, SYRACUSE, NEW YORK 13221

FOR THE RECORD

April 18, 1980

United States House Agriculture Subcommittee
on Department Investigations, Oversight and Research
Room 1301
Longworth House Office Building
Washington, D.C. 20515

Re: H.R.999 - Amendments to Plant Variety Protection Act

Attention: Ms. Abrams

Agway Inc., a farm supply cooperative serving agriculture in 12 northeastern states, wishes to go on record in support of H.R.999 - Amendments to the Plant Variety Protection Act.

As a breeder and developer of open pollinated varieties of four of the plants to be covered in the Act (peppers, tomatoes, carrots and cucumbers), we view their inclusion in the amendment as essential to the economic viability of continued research and development in this area.

Furthermore, this voluntary program, allowing breeders to protect non-hybrid plant varieties, has resulted in superior plants of greater quality that provide more nutritional and economic value for the American consumer.

We thank the committee members for allowing the inclusion of this statement in the hearing record.

Sincerely,

William E. Mohn

William E. Mohn
Manager, Seed Division

WEM:nd

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GALLATIN VALLEY SEED CO.
BOX 167 • TWIN FALLS, IDAHO 83301

April 18, 1980

Attention: U.S. HOUSE AGRICULTURE
SUBCOMMITTEE ON DEPARTMENT
INVESTIGATIONS, OVERSIGHT,
AND RESEARCH

Subject: H.R. 999 Proposed Amendments

I, Calvin R. Lamborn, Research Director for the Gallatin Valley Seed Co., would like to go on record in support of the proposed amendments contained in H.R. 999.

An indication of the value of adding the six vegetables, originally excluded from the Plant Variety Protection Act, can be determined by studying the effect this Act has had on the breeding of those vegetables which were originally included.

Our company specializes in the breeding and development of pea and snap bean varieties suited for canning and freezing by the processing industry. It takes a minimum of eight to ten years to breed, select, increase, test and to first market a new variety. I have been employed in this business just over ten years. This has given me the opportunity to be closely involved with the full cycle from breeding to marketing of new varieties. For example, the first independent cross I made (in the fall of 1969), resulted in the 'Sugar Snap' pea.

I have been able to clearly see the stimulating effect which the Plant Variety Protection Act (PVP) has had upon our breeding programs. The fact that a novelty is required to obtain PVP has stimulated us to broaden our gentic base and the diversity of our potential varieties. A wider range of types increases our chances of supplying the varied processor needs as well as increase our chances of having sufficient novelty to obtain PVP. The size and scope of our breeding programs

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have expanded several times within the past 10 years. For example, our pea breeding nursery has expanded from an area of ¼ to 1/3 of an acre to over 10 acres.

One of our main objectives is to incorporate as much disease resistance as possible. Ten years ago we were actively breeding for resistance to two diseases of peas and two diseases of beans. Today that list has expanded to eight diseases of peas and seven of beans. We are eager to add to this multiple disease resistance as new resistance to other diseases is found. Genetic resistance is clearly the best method to control plant diseases. Selection and screening for disease resistance adds greatly to our work load but these programs are well worth the investment.

The PVP Act has added to our stimulation to search for and to incorporate into our new varieties with as much disease resistance as possible. Any new variety has to be clearly better than the current ones before growers will make the change. Additional disease resistance is an obvious improvement in any area where that disease is a problem. The combination of disease resistance can also become part of the novel characteristics which could qualify a new variety for PVP. Currently, there is a great race within our industry to incorporate as much disease resistance as possible. Those who develop a new resistant variety first will find it easier to obtain PVP.

The PVP Act in fact, has had a significant influence in broadening and diversifying our genetic pool. This is evident by the increased number and diversity of varieties which we are currently developing. The effects of the PVP Act are just beginning to become evident in finished varieties because of the ten year lag time necessary to develop new varieties. Currently, we have PVP on only two pea and four bean varieties. The enclosed brochure lists our newest potential pea varieties which are being offered for trial this year. Eight of these new varieties are resistant to Powdery Mildew.

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Currently, we are increasing over 60 additional potential new pea varieties. Each year this potential list will expand in number as well as diversity of types.

We are all concerned about genetic uniformity. But to be uniformally resistant to a disease is the opposite to being uniformally susceptible. Uniform resistance can be incorporated into a great multitude of different genetic backgrounds which the PVP stimulates.

The Gallatin Valley Seed Co. has received a great deal of publicity for the breeding, development, and marketing of the 'Sugar Snap' pea. The exuberant response for this new variety from home gardeners is good evidence of the acceptance and continued interest in this class of edible pod pea. This assurance has not always existed. The development started as a curiosity. Some of us within our company were optimistic about the potential but others in management were doubtful.

I am convinced that 'Sugar Snap' would not have been promoted by our company without the potential of PVP. Our company has not been in the business of selling seed to suppliers of the home garden market. Most of these companies either grow their own pea seed or have agents which produce it for them. Our management knew very well that many of our sales would be on a one-time basis without PVP.

The guaranty of PVP for future 'Sugar Snap' type varieties has stimulated us to expand our breeding in this area. We are already increasing several improved 'Snap Pea' varieties. Some are earlier maturing, on dwarf vines, with multiple disease resistance; and they are also stringless. Within five years, stringless 'Snap Pea' varieties suitable for processing will be available from our company. These varieties will double to triple the yield of usable product over shelled peas because of the added harvest of the pods with the peas. The extensive research necessary for these developments would not have been permitted without the promise of PVP.

We started our breeding with the 'Snap Pea' class as a curiosity and thought for some time that the idea was completly novel

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with us. Since then, we have learned the 'Snap Pea' potential has existed for over 100 years. In 1885, there was a type called 'Butter Sugars' which had the thick pod flesh and were edible, similar to 'Sugar Snap'. We have learned of at least two attempts where seed companies have tried to market types similar to 'Sugar Snap'. Their attempts failed.

Again, PVP gave us the incentive not only to increase the seed of 'Sugar Snap' but also to actively promote and market this variety because the potential pay back was there.

It may be of interest to note what home gardeners have to pay us for our royalties because we have PVP on 'Sugar Snap'. The additional cost is less than one cent per one ounce package of seed.

I am sure home gardeners will be happy to pay this additional cost for future improved varieties.

It is not unreasonable to assume that PVP could stimulate similar development in other vegetables as it has done for us.

Sincerely,

Calvin Lamborn

Calvin Lamborn
Research Director
GALLATIN VALLEY SEED COMPANY

CL/dp

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Heinz U.S.A.

Division of H. J. Heinz Company

P. O. Box 57
Tracy, California 95376
Telephone: 209 835-0570

April 22, 1980

U.S. House Agriculture
Subcommittee on Dept. Investigations,
Oversight and Research
Room 1301, Longworth House Office Building
Washington, D.C. 20515

Attn: Ms. Abrams

To: Chairman de la Garza

I would like to submit the following comments for the record regarding H.R. 999, the Plant Variety Protection Act Amendment, on behalf of Heinz USA.

Heinz USA, a food processing company, is supportive of H.R. 999. Our reason for supporting H.R. 999 is the present trend among Seed Companies to develop and produce hybrids in those varieties not protected by the current Plant Patent Act. Hybrid tomatoes for processing, in our opinion, generally offer no advantage to the grower or processing company. However, a Hybrid does protect the Seed Company which developed it from losing its production of that seed to a competing Seed Company. We understand a Company attempting to protect its right to regain its research and development costs on a new tomato variety. However, the Hybrid System results in much higher seed costs to the grower, and uncertainty of timely seed delivery as all hybrid tomato seed production is done outside the United States.

It appears that H.R. 999 offers the variety protection obviously needed by American Seed Companies and should eliminate the high cost and uncertainties of production associated with the Hybrid System.

Sincerely,

H.J. HEINZ COMPANY

B.F. George, Mgr.
Agricultural Research

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NATIONAL COALITION FOR DEVELOPMENT ACTION

ROOM 5 • 122 WEST FRANKLIN AVENUE • MINNEAPOLIS, MINNESOTA 55404 • PHONE (612) 870-3661

April 22, 1980

The Honorable E. de la Garza
U. S. House of Representatives
Washington, D. C. 20515

Dear Mr. de la Garza:

The National Coalition for Development Action wishes to express its opposition to the plant patenting proposals included in HR 999. We request that this letter be made a formal part of the record of the hearings on these proposals.

The world's agricultural systems are based upon an incredible diversity of plant materials. It is this diversity which has made it possible for plants to adapt to different ecological circumstances and to evolve resistance to pests and diseases. Facilities such as the National Seed Storage Laboratory are vital, but we cannot expect such laboratories to be a complete substitute for the world's variety of natural habitats. Plant patenting would contribute to a reduction in the diversity of germ plasm materials.

Because plant patenting provides an economic incentive to keep information secret, such laws would inbigit the free flow of scientific information and plant breeding materials. Such laws would, therefore, inhibit crop breeding research, especially by small firms and publicly funded research centers.

The adoption of plant patenting laws would give large companies with large budgets for research and legal expenses an additional advantage over small companies with more limited resources. The consolidation of the seed industry has been well documented. To encourage further consolidation could result in making the world's food supply dependent on a very few suppliers.

For these reasons we oppose HR 999 and urge you to reject such proposals.

Sincerely,

Victoria P. Oshiro

Victoria P. Oshiro

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ISTA Indiana Seed Trade Association

FOR THE RECORD
3510 US 52 SOUTH
LAFAYETTE, INDIANA 47905
PHONE (317) 474-3494

April 29, 1980

The Honorable Kika de la Garza
Chairman, Subcommittee on Department
Investigation, Oversight & Research
House of Representatives
Washington, D. C. 20515

Dear Congressman de la Garza:

As Secretary-Treasurer of the Indiana Seed Trade Association, I would like to comment on the benefit and need for the Plant Variety Protection Act and the proposed amendments to the Act.

The PVPA does not regulate the growing of varieties nor does it ban the use of varieties. The PVPA is voluntary, as no one is required to protect his variety. If he so chooses to protect a variety, he then has protection against his variety being stolen or pirated.

Seedsmen are independent businessmen and in competition with each other. They are in business to sell seed of various varieties and types, as many as they can.

The only breeders or owners now excluded from the protection of the PVPA are the breeders of six vegetable species. These breeders should be allowed the same voluntary protection under the law as proposed in the amendments to the Act.

The commercial soybean breeding programs have increased tremendously since 1970, and are due in no small way to the protection available on new varieties contained in the Act. Additional investment in research has also been an indication of the positive effect of the PVPA.

Almost six hundred fifty certificates have been issued on over fifty species by the Plant Variety Protection office since 1970. Most new varieties are being protected, both by private breeders and public institutions.

In conclusion; the Act provides both a research exemption and a farmers' exemption. The research exemption allows protected varieties to be used as germplasm in developing new varieties. The farmers' exemption allows farmers who are not seedsmen to replant their own seed of a protected variety.

I support the proposed amendments to the Act and propose that overall the Plant Variety Protection Act has encouraged the development of non-hybrid varieties, which in the long run are beneficial to increasing raw agricultural products from the American farm.

Sincerely,

Scot MacNab

Scot MacNab
Secretary-Treasurer

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western union Mailgram

HUMBERTO PENA
OPERATIONS AND OVERSIGHT COMMITTEE
ROOM 1302 LONGWORTH OFFICE BLDG
WASHINGTON DC 20515

RE HR 999 PLEASE DO NOT FURTHER THE CAUSE OF SEED PATENTING SEEDS ARE TOO IMPORTANT TO TRUST TO A FEW HANDS LOCAL VARIABILITY AND ADAPTABILITY ARE IMPORTANT BEWARE OF EUROPEAN EXPERIENCE MAKING MANY SEEDS ILLEGAL SEEDS AND GREEN PLANTS ARE AMONG OUR MOST VALUABLE ALLIES WE NEED TO USE AS MANY DIFFERENT KINDS AND VARIETIES AS POSSIBLE HAPPY UN EARTH DAY
BILL DUESING SMALL FARMER
153 ROGERSHILL RD
OXFORD CT 06483

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April 15, 1980

The Honorable E. de la Garza, Chairman
House of Representatives
Washington, D. C. 20515

FOR THE RECORD

Dear Mr. de la Garza:

As a private citizen who has been engaged in agriculture all my life, first as a Pennsylvania farm boy, then a student, a teacher, a food processor representative and as a consultant after retirement, I urge the passing of H. R. Bill No. 999.

I believe you desire to serve All the people of United States. Having studied and taught Agriculture in most all areas of United States and many areas abroad as well, I believe passage of H. R. 999 is urgently needed. By amending the present Plant Variety Protection Act you will be aiding and encouraging scientific development of new and better varieties of those six crops excluded from the 1970 act. By passage of H. R. Bill 999, the most important industry in the world will be benefited - i.e. producing food and fiber for the people of the world. The producers, the handler and the consumer will all be equally benefited. Better crop yields, better quality, more plentiful foods all are of economic importance to us individually and collectively. I am a concerned Senior Citizen.

Respectfully yours,

Willis C. Moore,

Willis C. Moore
435 Hollywood Ave.
Tracy, California 95076

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April 16, 1980

The Honorable E. de la Garza, Chairman
House of Representatives
Washington, D. C. 20515

ATTN: MR. E. DE LA GARZA

Dear Mr. de la Garza:

SUBJECT: PLANT VARIETY PROTECTION HEARINGS - H.R. 999

I am a commissioned seed salesman. The higher the price per pound of seed, the more commission I make. Not being able to register and protect certain kinds of open pollinated vegetables has forced many companies, including the ones I have worked for, to spend their research dollars on hybrids. Hybrids are protectable, as long as no one steals the parent lines (inbreds). These hybrids sell for many more dollars per pound than open pollinated varieties, even though they don't always yield more produce. This means the farmers who want new and better varieties have no choice but to buy the expensive hybrid seeds.

I make more commission and my customers have no choice, if they want better varieties than their fathers had. I love it!!

Sincerely,

J. Stephen Mitchell
Seed Salesmen

900 Susan Court
Gilroy, Ga. 95020

AUG 20 1980

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